SEQUENCE LISTING

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<120> Optimized Multi-epitope Constructs and Uses Thereof

<130> 2060.0200003

<150> US 60/415,463
<151> 2002-10-03

<150> US 60/419,973
<151> 2002-10-22

<160> 479

<170> PatentIn version 3.2

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Trp Leu Ser Leu Leu Val Pro Phe Val
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Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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Gly Leu Ser Arg Tyr Val Ala Arg Leu
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Tyr Met Asp Asp Val Val Leu Gly Val
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Ala Leu Met Pro Leu Tyr Ala Cys Ile
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Gly Leu Ser Pro Thr Val Trp Leu Ser Val
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Ser Thr Leu Pro Glu Thr Thr Val Val Arg Arg
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Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr
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Asp Leu Leu Asp Thr Ala Ser Ala Leu Tyr
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Ala Ser Phe Cys Gly Ser Pro Tyr
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Arg Trp Met Cys Leu Arg Arg Phe Ile Ile
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Ser Trp Pro Lys Phe Ala Val Pro Asn Leu
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Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe
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Glu Tyr Leu Val Ser Phe Gly Val Trp
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Gly Tyr Pro Ala Leu Met Pro Leu Tyr
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Lys Tyr Thr Ser Phe Pro Trp Leu Leu
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Ser Tyr Ile Pro Ser Ala Glu Lys Ile
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<210> 57
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Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala Asp
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Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile
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Met Thr Leu Ala
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Leu Cys Gln Val Phe Ala Asp Ala Thr Pro Thr Gly Trp Gly Leu
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Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Asn
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Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe
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ccttggctcc ttaatgccgc cgctaggttt tcatggctga gtctgctagt acctttcaat 180

gcggctttcc cacattgcct agcttttagc tatatgaaag ctgctttagt cgtggacttt 240

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Ala Ala Ala Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala Ala Ala
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Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Phe Pro
50 55 60

His Cys Leu Ala Phe Ser Tyr Met Lys Ala Ala Leu Val Val Asp Phe
65 70 75 80

Ser Gln Phe Ser Arg Gly Ala Ile Leu Leu Leu Cys Leu Ile Phe Leu
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Leu Asn Ala Ala Ala His Thr Leu Trp Lys Ala Gly Ile Leu Tyr Lys
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Lys Ala Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Tyr
      115                 120                 125

Pro Ala Leu Met Pro Leu Tyr Ala Cys Ile Gly Ala Ala Ala Trp Leu
  130                 135                 140

Ser Leu Leu Val Pro Phe Val Asn Ala Ala Ala Gly Phe Leu Leu Thr
145                 150                 155                 160

Arg Ile Leu Thr Ile Asn Ala Ala Ala Ile Pro Ile Pro Ser Ser Trp
                165                 170                 175

Ala Phe Lys Ala Ala Ala Glu Tyr Leu Val Ser Phe Gly Val Trp Asn
          180                 185                 190

Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Ala Ala Ala Phe Leu Pro
      195                 200                 205

Ser Asp Phe Phe Pro Ser Val Lys Ala Ala Ala Asp Leu Leu Asp Thr
  210                 215                 220

Ala Ser Ala Leu Tyr Asn Ser Trp Pro Lys Phe Ala Val Pro Asn Leu
225                 230                 235                 240

Lys Ala Ala Ala Ser Ala Ile Cys Ser Val Val Arg Arg Lys Leu Ser
                245                 250                 255

Leu Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala Ala Lys Phe Val Ala
          260                 265                 270

Ala Trp Thr Leu Lys Ala Ala Ala Lys Ala Ala Asn Val Ser Ile Pro
      275                 280                 285

Trp Thr His Lys Gly Ala Ala Gly Leu Ser Arg Tyr Val Ala Arg Leu
  290                 295                 300

Asn Ala Ala Ala Ser Thr Leu Pro Glu Thr Thr Val Val Arg Arg Lys
305                 310                 315                 320

His Pro Ala Ala Met Pro His Leu Leu Lys Ala Ala Ala Arg Trp Met
                325                 330                 335

Cys Leu Arg Arg Phe Ile Ile Asn Ala Ser Phe Cys Gly Ser Pro Tyr
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Lys Ala Ala Tyr Met Asp Asp Val Val Leu Gly Val Asn Ala Leu Trp
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Phe His Ile Ser Cys Leu Thr Phe Lys Ala Ala Ala Thr Pro Ala Arg
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405 410 415

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Gly Trp Gly Leu Gly Pro Gly Pro Gly Arg His Tyr Leu His Thr Leu
        35                  40                  45

Trp Lys Ala Gly Ile Leu Tyr Lys Gly Pro Gly Pro Gly Pro His His
    50                  55                  60

Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met Thr Leu
65                  70                  75                  80

Ala Gly Pro Gly Pro Gly Glu Ser Arg Leu Val Val Asp Phe Ser Gln
                85                  90                  95

Phe Ser Arg Gly Asn Gly Pro Gly Pro Gly Pro Phe Leu Leu Ala Gln
            100                 105                 110

Phe Thr Ser Ala Ile Cys Ser Val Val Gly Pro Gly Pro Gly Leu Val
        115                 120                 125

Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Gly Pro Gly
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Pro Gly Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys
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Ile Gly Pro Gly Pro Gly Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp
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Val Ser Ala Ala Phe Gly Pro Gly Pro Gly Leu Gln Ser Leu Thr Asn
            180                 185                 190

Leu Leu Ser Ser Asn Leu Ser Trp Leu Gly Pro Gly Pro Gly Ala Gly
        195                 200                 205

Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Gly Pro Gly
    210                 215                 220

Pro Gly Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala Tyr Arg
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225 230 235 240

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245 250 255

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260 265 270

Gln Cys Phe Arg Lys Leu Pro Val Asn Arg Pro Ile Asp Trp Gly Pro
275 280 285

Gly Pro Gly Ala Ala Asn Trp Ile Leu Arg Gly Thr Ser Phe Val Tyr
290 295 300

Val Pro Gly Pro Gly Pro Gly Lys Gln Ala Phe Thr Phe Ser Pro Thr
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Ala Trp Thr Leu Lys Ala Ala Ala
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<210> 87
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<400> 88

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<213> Homo sapiens

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Arg Leu His Cys Leu Ala Phe Ser Gln Arg
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His Ala Ala Ala Met Pro His Ser Cys
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Ala Ala Ala Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala Ala Ala
35 40 45

Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Phe Pro
50 55 60

His Cys Leu Ala Phe Ser Tyr Met Lys Ala Ala Leu Val Val Asp Phe
65 70 75 80

Ser Gln Phe Ser Arg Gly Ala Ile Leu Leu Leu Cys Leu Ile Phe Leu
85 90 95

Leu Asn Ala Ala Ala His Thr Leu Trp Lys Ala Gly Ile Leu Tyr Lys
100 105 110

Lys Ala Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Tyr
115 120 125

Pro Ala Leu Met Pro Leu Tyr Ala Cys Ile Gly Ala Ala Ala Trp Leu
130 135 140

Ser Leu Leu Val Pro Phe Val Asn Ala Ala Ala Gly Phe Leu Leu Thr
145 150 155 160

Arg Ile Leu Thr Ile Asn Ala Ala Ala Ile Pro Ile Pro Ser Ser Trp
165 170 175

Ala Phe Lys Ala Ala Ala Glu Tyr Leu Val Ser Phe Gly Val Trp Asn
180 185 190

Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Ala Ala Ala Phe Leu Pro
195 200 205

Ser Asp Phe Phe Pro Ser Val Lys Ala Ala Ala Asp Leu Leu Asp Thr
210 215 220

Ala Ser Ala Leu Tyr Asn Ser Trp Pro Lys Phe Ala Val Pro Asn Leu
225 230 235 240

Lys Ala Ala Ala Ser Ala Ile Cys Ser Val Val Arg Arg Lys Leu Ser
245 250 255

```
Leu Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala Ala Lys Phe Val Ala
            260                 265                 270

Ala Trp Thr Leu Lys Ala Ala Ala Lys Ala Ala Asn Val Ser Ile Pro
        275                 280                 285

Trp Thr His Lys Gly Ala Ala Gly Leu Ser Arg Tyr Val Ala Arg Leu
    290                 295                 300

Asn Ala Ala Ala Ser Thr Leu Pro Glu Thr Thr Val Val Arg Arg Lys
305                 310                 315                 320

His Pro Ala Ala Met Pro His Leu Leu Lys Ala Ala Ala Arg Trp Met
                325                 330                 335

Cys Leu Arg Arg Phe Ile Ile Asn Ala Ser Phe Cys Gly Ser Pro Tyr
            340                 345                 350

Lys Ala Ala Tyr Met Asp Asp Val Val Leu Gly Val Asn Ala Leu Trp
        355                 360                 365

Phe His Ile Ser Cys Leu Thr Phe Lys Ala Ala Ala Thr Pro Ala Arg
    370                 375                 380

Val Thr Gly Gly Val Phe Lys Ala Ala Ala Leu Thr Phe Gly Arg Glu
385                 390                 395                 400

Thr Val Leu Glu Tyr Lys Gln Ala Phe Thr Phe Ser Pro Thr Tyr Lys
                405                 410                 415

Asn Ala Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala
            420                 425                 430

Asp Gly Pro Gly Pro Gly Leu Cys Gln Val Phe Ala Asp Ala Thr Pro
        435                 440                 445

Thr Gly Trp Gly Leu Gly Pro Gly Pro Gly Arg His Tyr Leu His Thr
    450                 455                 460

Leu Trp Lys Ala Gly Ile Leu Tyr Lys Gly Pro Gly Pro Gly Pro His
465                 470                 475                 480

His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met Thr
                485                 490                 495

Leu Ala Gly Pro Gly Pro Gly Glu Ser Arg Leu Val Val Asp Phe Ser
```

500 505 510

Gln Phe Ser Arg Gly Asn Gly Pro Gly Pro Gly Pro Phe Leu Leu Ala
515 520 525

Gln Phe Thr Ser Ala Ile Cys Ser Val Val Gly Pro Gly Pro Gly Leu
530 535 540

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Gly Pro
545 550 555 560

Gly Pro Gly Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg
565 570 575

Lys Ile Gly Pro Gly Pro Gly Ser Ser Asn Leu Ser Trp Leu Ser Leu
580 585 590

Asp Val Ser Ala Ala Phe Gly Pro Gly Pro Gly Leu Gln Ser Leu Thr
595 600 605

Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Gly Pro Gly Pro Gly Ala
610 615 620

Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Gly Pro
625 630 635 640

Gly Pro Gly Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala Tyr
645 650 655

Arg Pro Pro Asn Ala Pro Ile Gly Pro Gly Pro Gly Val Gly Pro Leu
660 665 670

Thr Val Asn Glu Lys Arg Arg Leu Lys Leu Ile Gly Pro Gly Pro Gly
675 680 685

Lys Gln Cys Phe Arg Lys Leu Pro Val Asn Arg Pro Ile Asp Trp Gly
690 695 700

Pro Gly Pro Gly Ala Ala Asn Trp Ile Leu Arg Gly Thr Ser Phe Val
705 710 715 720

Tyr Val Pro Gly Pro Gly Pro Gly Lys Gln Ala Phe Thr Phe Ser Pro
725 730 735

Thr Tyr Lys Ala Phe Leu Cys Gly Pro Gly Pro Gly Ala Lys Phe Val
740 745 750

Ala Ala Trp Thr Leu Lys Ala Ala Ala Gly Ser
755 760

<210> 207
<211> 2235
<212> DNA
<213> Hepatitis B virus

<400> 207
atgggcatgc aggtgcagat ccagagcctg ttcctgctcc tgctgtgggt gccaggaagc 60

agaggctttc tcctgtccct gggcatccac ctgaacgccg ctgcaaagta caccagcttc 120

ccctggctgc tcaacgccgc tgcccggttc agctggctgt ccctgctcgt gcccttcaac 180

gcagccttcc cccactgcct ggccttcagc tacatgaaag cagccctggt ggtcgacttc 240

tcccagttca gccggggagc catcctgctc ctgtgcctga tctttctgct caacgccgct 300

gcccacaccc tgtggaaggc tggcatcctg tacaagaaag cctggatgat gtggtactgg 360

ggacccagcc tgtacaaggc atatccagcc ctgatgcccc tgtacgcctg catcggagct 420

gccgcatggc tgagcctcct ggtgcccttc gtgaacgccg ctgccgggtt cctgctgaca 480

agaatcctga ccatcaacgc cgcagccatt cctatccccc ccagctgggc cttcaaggca 540

gccgccgagt acctggtgag cttcggagtc tggaacctgc ccagcgactt ctttcccagc 600

gtgaaagccg cagccttcct gccctccgac ttctttccca gcgtgaaggc cgcagccgat 660

ctcctggaca ccgctagcgc cctgtacaac agctggccca agttcgccgt gcccaacctg 720

aaggccgcag ccagcgccat ctgcagcgtg gtcagacgga agctgtccct cgatgtgagc 780

gccgctttct acaacgccgc cgcaaagttc gtggccgcct ggaccctgaa agccgctgcc 840

aaggcagcca acgtgagcat cccctggacc cacaaaggag ccgcaggact gagccggtat 900

gtggccagac tgaacgccgc tgccagcacc ctgcccgaga ccacagtggt cagacggaag 960

caccccgccg ccatgcccca cctgctgaag gccgcagccc ggtggatgtg cctcagacgg 1020

ttcatcatca acgcttcctt ctgtggcagc ccctacaagg ccgcctacat ggatgacgtg 1080

gtcctgggag tgaacgccct ctggttccac atcagctgcc tgaccttcaa agccgctgcc 1140

acacccgcaa gagtgaccgg aggcgtgttc aaggctgcag ccctgacctt cggccgggag 1200

accgtgctgg agtacaagca ggccttcacc ttcagcccca cctacaagaa cgccggcacc 1260

agctttgtgt acgtcccaag cgccctgaat cccgcagacg gccccggccc cggactgtgc 1320

caggtgttcg ccgatgccac accaaccgga tggggcctgg gccctggacc cggcagacac 1380

tacctgcata ccctgtggaa ggcaggaatc ctgtacaaag gccccggccc tggaccccat 1440

cacaccgctc tgcggcaggc catcctgtgc tggggcgagc tcatgactct ggcaggaccc 1500

ggccccggcg aatccaggct ggtggtggac tttagccagt tctccagagg caacggaccc 1560

ggcccaggac ccttcctgct cgcccagttc accagcgcca tctgcagcgt ggtcggacct 1620

ggcccaggac tggtgccctt cgtgcagtgg ttcgtcggcc tcagccccac cgtcggacct 1680

ggccccggcc tgcacctcta cagccaccct atcattctgg gcttcagaaa gatcggacca 1740

ggccccggct ccagcaacct gtcctggctc agcctggacg tcagcgcagc cttcggaccc 1800

ggccctggcc tgcagagcct gaccaacctg ctcagcagca acctcagctg gctgggccca 1860

ggacccggcg caggcttctt tctgctcacc agaatcctga ccatccctca gagcggcccc 1920

ggaccaggcg tgagcttcgg cgtgtggatt cggactcctc ccgcctacag acccccaaat 1980

gcccccatcg gcccaggacc cggcgtcgga cctctgactg tgaacgagaa gcggagactg 2040

aagctgatcg gccccggacc aggcaaacag tgcttcagga agctccctgt gaacagacct 2100

atcgactggg gccccggacc cggcgcagcc aactggattc tgagaggcac cagcttcgtg 2160

tacgtccctg gacccggccc tggcaagcaa gccttcacct tcagccccac ctacaaggca 2220

ttcctgtgcg gatag 2235

<210> 208
<211> 744
<212> PRT
<213> Hepatitis B virus

<400> 208

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Phe Leu Leu Ser Leu Gly Ile His Leu Asn
20 25 30

Ala Ala Ala Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala Ala Ala
35 40 45

Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Phe Pro
50 55 60

His Cys Leu Ala Phe Ser Tyr Met Lys Ala Ala Leu Val Val Asp Phe
65 70 75 80

Ser Gln Phe Ser Arg Gly Ala Ile Leu Leu Leu Cys Leu Ile Phe Leu
85 90 95

Leu Asn Ala Ala Ala His Thr Leu Trp Lys Ala Gly Ile Leu Tyr Lys
100 105 110

Lys Ala Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Tyr
115 120 125

```
Pro Ala Leu Met Pro Leu Tyr Ala Cys Ile Gly Ala Ala Ala Trp Leu
    130                 135                 140

Ser Leu Leu Val Pro Phe Val Asn Ala Ala Ala Gly Phe Leu Leu Thr
145                 150                 155                 160

Arg Ile Leu Thr Ile Asn Ala Ala Ala Ile Pro Ile Pro Ser Ser Trp
                165                 170                 175

Ala Phe Lys Ala Ala Ala Glu Tyr Leu Val Ser Phe Gly Val Trp Asn
            180                 185                 190

Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Ala Ala Ala Phe Leu Pro
        195                 200                 205

Ser Asp Phe Phe Pro Ser Val Lys Ala Ala Ala Asp Leu Leu Asp Thr
    210                 215                 220

Ala Ser Ala Leu Tyr Asn Ser Trp Pro Lys Phe Ala Val Pro Asn Leu
225                 230                 235                 240

Lys Ala Ala Ala Ser Ala Ile Cys Ser Val Val Arg Arg Lys Leu Ser
                245                 250                 255

Leu Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala Ala Lys Phe Val Ala
            260                 265                 270

Ala Trp Thr Leu Lys Ala Ala Ala Lys Ala Ala Asn Val Ser Ile Pro
        275                 280                 285

Trp Thr His Lys Gly Ala Ala Gly Leu Ser Arg Tyr Val Ala Arg Leu
    290                 295                 300

Asn Ala Ala Ala Ser Thr Leu Pro Glu Thr Thr Val Val Arg Arg Lys
305                 310                 315                 320

His Pro Ala Ala Met Pro His Leu Leu Lys Ala Ala Ala Arg Trp Met
                325                 330                 335

Cys Leu Arg Arg Phe Ile Ile Asn Ala Ser Phe Cys Gly Ser Pro Tyr
            340                 345                 350

Lys Ala Ala Tyr Met Asp Asp Val Val Leu Gly Val Asn Ala Leu Trp
        355                 360                 365

Phe His Ile Ser Cys Leu Thr Phe Lys Ala Ala Ala Thr Pro Ala Arg
```

370 375 380

Val Thr Gly Gly Val Phe Lys Ala Ala Ala Leu Thr Phe Gly Arg Glu
385 390 395 400

Thr Val Leu Glu Tyr Lys Gln Ala Phe Thr Phe Ser Pro Thr Tyr Lys
405 410 415

Asn Ala Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala
420 425 430

Asp Gly Pro Gly Pro Gly Leu Cys Gln Val Phe Ala Asp Ala Thr Pro
435 440 445

Thr Gly Trp Gly Leu Gly Pro Gly Pro Gly Arg His Tyr Leu His Thr
450 455 460

Leu Trp Lys Ala Gly Ile Leu Tyr Lys Gly Pro Gly Pro Gly Pro His
465 470 475 480

His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met Thr
485 490 495

Leu Ala Gly Pro Gly Pro Gly Glu Ser Arg Leu Val Val Asp Phe Ser
500 505 510

Gln Phe Ser Arg Gly Asn Gly Pro Gly Pro Gly Pro Phe Leu Leu Ala
515 520 525

Gln Phe Thr Ser Ala Ile Cys Ser Val Val Gly Pro Gly Pro Gly Leu
530 535 540

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Gly Pro
545 550 555 560

Gly Pro Gly Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg
565 570 575

Lys Ile Gly Pro Gly Pro Gly Ser Ser Asn Leu Ser Trp Leu Ser Leu
580 585 590

Asp Val Ser Ala Ala Phe Gly Pro Gly Pro Gly Leu Gln Ser Leu Thr
595 600 605

Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Gly Pro Gly Pro Gly Ala
610 615 620

Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Gly Pro
625 630 635 640

Gly Pro Gly Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala Tyr
645 650 655

Arg Pro Pro Asn Ala Pro Ile Gly Pro Gly Pro Gly Val Gly Pro Leu
660 665 670

Thr Val Asn Glu Lys Arg Arg Leu Lys Leu Ile Gly Pro Gly Pro Gly
675 680 685

Lys Gln Cys Phe Arg Lys Leu Pro Val Asn Arg Pro Ile Asp Trp Gly
690 695 700

Pro Gly Pro Gly Ala Ala Asn Trp Ile Leu Arg Gly Thr Ser Phe Val
705 710 715 720

Tyr Val Pro Gly Pro Gly Pro Gly Lys Gln Ala Phe Thr Phe Ser Pro
725 730 735

Thr Tyr Lys Ala Phe Leu Cys Gly
740

<210> 209
<211> 621
<212> DNA
<213> Hepatitis B virus

<400> 209
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc 60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg 120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgtt cctgctgtcc 180

ctgggaatcc acctgtatat ggatgacgtg gtgctgggag tgggactgtc caggtacgtg 240

gctaggctgt tcctgctgac cagaatcctg accatctcca ccctgccaga gaccaccgtg 300

gtgaggaggc aggccttcac ctttagccct acctataagt ggctgagcct gctggtgccc 360

tttgtgatcc ctatccctag ctcctgggct ttcaccccag ccagggtgac cggaggagtg 420

tttaaggtgg gaaacttcac cggcctgtat ctgcccagcg atttctttcc tagcgtgacc 480

ctgtggaagg ccgggatcct gtacaagaat gtgtccatcc cttggaccca caagctggtg 540

gtggactttt cccagttcag cagatccgct atctgctccg tggtgaggag agctctgatg 600

ccactgtatg cctgtatctg a 621

<210> 210

<211> 206
<212> PRT
<213> Hepatitis B virus

<400> 210

```
Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                  10                  15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
            20                  25                  30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
        35                  40                  45

Pro Ser Asp Phe Phe Pro Ser Val Phe Leu Leu Ser Leu Gly Ile His
    50                  55                  60

Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr Val
65                  70                  75                  80

Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu Pro
                85                  90                  95

Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr Tyr
            100                 105                 110

Lys Trp Leu Ser Leu Leu Val Pro Phe Val Ile Pro Ile Pro Ser Ser
        115                 120                 125

Trp Ala Phe Thr Pro Ala Arg Val Thr Gly Gly Val Phe Lys Val Gly
    130                 135                 140

Asn Phe Thr Gly Leu Tyr Leu Pro Ser Asp Phe Phe Pro Ser Val Thr
145                 150                 155                 160

Leu Trp Lys Ala Gly Ile Leu Tyr Lys Asn Val Ser Ile Pro Trp Thr
                165                 170                 175

His Lys Leu Val Val Asp Phe Ser Gln Phe Ser Arg Ser Ala Ile Cys
            180                 185                 190

Ser Val Val Arg Arg Ala Leu Met Pro Leu Tyr Ala Cys Ile
        195                 200                 205
```

<210> 211
<211> 660
<212> DNA
<213> Hepatitis B virus

<400> 211
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc 60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg 120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgaa cttcctgctg 180

tccctgggaa tccacctgta tatggatgac gtggtgctgg gagtgggact gtccaggtac 240

gtggctaggc tgttcctgct gaccagaatc ctgaccatct ccaccctgcc agagaccacc 300

gtggtgagga ggcaggcctt cacctttagc cctacctata agggagccgc tgcctggctg 360

agcctgctgg tgccctttgt gaatatccct atccctagct cctgggcttt caagacccca 420

gccagggtga ccggaggagt gtttaaggtg ggaaacttca ccggcctgta taacctgccc 480

agcgatttct ttcctagcgt gaagaccctg tggaaggccg gaatcctgta caagaatgtg 540

tccatccctt ggacccacaa gggagccgct ctggtggtgg acttttccca gttcagcaga 600

aattccgcta tctgctccgt ggtgaggaga gctctgatgc cactgtatgc ctgtatctga 660

<210> 212
<211> 219
<212> PRT
<213> Hepatitis B virus

<400> 212

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
20 25 30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
35 40 45

Pro Ser Asp Phe Phe Pro Ser Val Asn Phe Leu Leu Ser Leu Gly Ile
50 55 60

His Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr
65 70 75 80

Val Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu
85 90 95

Pro Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr
100 105 110

Tyr Lys Gly Ala Ala Ala Trp Leu Ser Leu Leu Val Pro Phe Val Asn
115 120 125

```
Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Thr Pro Ala Arg Val Thr
    130                 135                 140

Gly Gly Val Phe Lys Val Gly Asn Phe Thr Gly Leu Tyr Asn Leu Pro
145                 150                 155                 160

Ser Asp Phe Phe Pro Ser Val Lys Thr Leu Trp Lys Ala Gly Ile Leu
                165                 170                 175

Tyr Lys Asn Val Ser Ile Pro Trp Thr His Lys Gly Ala Ala Leu Val
            180                 185                 190

Val Asp Phe Ser Gln Phe Ser Arg Asn Ser Ala Ile Cys Ser Val Val
        195                 200                 205

Arg Arg Ala Leu Met Pro Leu Tyr Ala Cys Ile
    210                 215
```

<210> 213
<211> 9
<212> PRT
<213> Hepatitis B virus

<400> 213

```
Thr Leu Asn Phe Pro Ile Ser Pro Ile
1               5
```

<210> 214
<211> 10
<212> PRT
<213> Hepatitis B virus

<400> 214

```
Ser Leu Leu Asn Ala Thr Asp Ile Ala Val
1               5                   10
```

<210> 215
<211> 10
<212> PRT
<213> Hepatitis B virus

<400> 215

```
Gln Met Ala Val Phe Ile His Asn Phe Lys
1               5                   10
```

<210> 216
<211> 11
<212> PRT
<213> Hepatitis B virus

<400> 216

Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys
1 5 10

<210> 217
<211> 9
<212> PRT
<213> Hepatitis B virus

<400> 217

Phe Pro Val Arg Pro Gln Val Pro Leu
1 5

<210> 218
<211> 10
<212> PRT
<213> Hepatitis B virus

<400> 218

Tyr Pro Leu Ala Ser Leu Arg Ser Leu Phe
1 5 10

<210> 219
<211> 10
<212> PRT
<213> Hepatitis B virus

<400> 219

Val Ile Tyr Gln Tyr Met Asp Asp Leu Tyr
1 5 10

<210> 220
<211> 9
<212> PRT
<213> Hepatitis B virus

<400> 220

Ile Tyr Gln Glu Pro Phe Lys Asn Leu
1 5

<210> 221
<211> 9
<212> PRT
<213> Hepatitis B virus

<400> 221

Ile Trp Gly Cys Ser Gly Lys Leu Ile
1 5

<210> 222

<211> 4
<212> PRT
<213> Unknown

<220>
<223> Peptide linker

<400> 222

Gly Ala Ala Ala
1

<210> 223
<211> 4
<212> PRT
<213> Unknown

<220>
<223> Peptide linker

<400> 223

Asn Ala Ala Ala
1

<210> 224
<211> 4
<212> PRT
<213> Unknown

<220>
<223> Peptide linker

<400> 224

Lys Ala Ala Ala
1

<210> 225
<211> 277
<212> PRT
<213> Human immunodeficiency virus

<400> 225

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Lys Leu Val Gly Lys Leu Asn Trp Ala Gly
20 25 30

Ala Ala Ile Leu Lys Glu Pro Val His Gly Val Asn Ala Ala Cys Pro
35 40 45

Lys Val Ser Phe Glu Pro Ile Lys Ile Pro Ile His Tyr Cys Ala Pro
50 55 60

Ala Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys
65 70 75 80

Ala Phe Pro Val Arg Pro Gln Val Pro Leu Gly Ala Ala Lys Leu Thr
85 90 95

Pro Leu Cys Val Thr Leu Gly Ala Ala Ala Val Leu Ala Glu Ala Met
100 105 110

Ser Gln Val Lys Val Tyr Leu Ala Trp Val Pro Ala His Lys Gly Ala
115 120 125

Ala Ala Ala Ile Phe Gln Ser Ser Met Thr Lys Lys Thr Thr Leu Phe
130 135 140

Cys Ala Ser Asp Ala Lys Asn Ile Pro Tyr Asn Pro Gln Ser Gln Gly
145 150 155 160

Val Val Lys His Pro Val His Ala Gly Pro Ile Ala Asn Val Thr Val
165 170 175

Tyr Tyr Gly Val Pro Val Trp Lys Lys Ala Ala Ala Gln Met Ala Val
180 185 190

Phe Ile His Asn Phe Lys Asn Ala Ala Ala Tyr Pro Leu Ala Ser Leu
195 200 205

Arg Ser Leu Phe Asn Leu Thr Phe Gly Trp Cys Phe Lys Leu Asn Arg
210 215 220

Ile Leu Gln Gln Leu Leu Phe Ile Asn Ala Lys Ile Gln Asn Phe Arg
225 230 235 240

Val Tyr Tyr Arg Lys Ala Ala Val Thr Ile Lys Ile Gly Gly Gln Leu
245 250 255

Lys Lys Val Pro Leu Gln Leu Pro Pro Leu Lys Ala Met Thr Asn Asn
260 265 270

Pro Pro Ile Pro Val
275

<210> 226
<211> 834
<212> DNA
<213> Human immunodeficiency virus

<400> 226
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatcc 60

agaggaaagc tggtgggcaa actcaactgg gccggagctg caatcctgaa ggagcccgtc 120

cacggggtga atgccgcttg ccctaaagtc agcttcgaac caattaagat ccccattcat 180

tactgtgcac ctgccaaagc taagtttgtg gccgcttgga ccctcaaggc cgctgcaaaa 240

gccttcccag tgaggcccca ggtgcctctg ggcgccgcta aactcacacc actgtgcgtc 300

actctgggag ccgctgcagt gctggcagag gccatgtccc aagtgaaggt gtatctggct 360

tgggtgcccg cccacaaggg ggccgctgca gccatctttc agtctagcat gaccaagaaa 420

acaactctgt tctgtgcctc cgacgctaag aacatccctt ataatccaca gtctcagggc 480

gtggtcaagc atcccgtgca cgccggacct attgctaacg tgaccgtgta ctatggggtc 540

ccagtgtgga agaaagccgc tgcacagatg gccgtgttta ttcacaattt caaaaacgcc 600

gctgcatacc ccctcgccag cctgagatcc ctcttcaacc tgacattcgg ctggtgcttt 660

aagctgaacc ggatcctgca gcaactgctc tttatcaatg ctaaaatcca gaacttccgc 720

gtctactata ggaaggctgc agtgactatc aaaattggcg gacaactgaa gaaagtgcct 780

ctccagctgc cccctctcaa ggcaatgacc aacaatcccc ctatcccagt ctga 834

<210> 227
<211> 280
<212> PRT
<213> Human immunodeficiency virus

<400> 227

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Ile Pro Ile His Tyr Cys Ala Pro Ala Lys
20 25 30

Ala Ala Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Lys Ala Ala Val
35 40 45

Thr Ile Lys Ile Gly Gly Gln Leu Lys Lys Ala Lys Phe Val Ala Ala
50 55 60

Trp Thr Leu Lys Ala Ala Ala Lys Val Pro Leu Gln Leu Pro Pro Leu
65 70 75 80

Lys Ala Ile Phe Gln Ser Ser Met Thr Lys Lys Leu Thr Pro Leu Cys
85 90 95

Val Thr Leu Gly Ala Gln Met Ala Val Phe Ile His Asn Phe Lys Gly

100 105 110

Ala Lys Val Tyr Leu Ala Trp Val Pro Ala His Lys Asn Ala Ile Pro
115 120 125

Tyr Asn Pro Gln Ser Gln Gly Val Val Lys Ala Ile Leu Lys Glu Pro
130 135 140

Val His Gly Val Gly Ala Ala Ala Leu Thr Phe Gly Trp Cys Phe Lys
145 150 155 160

Leu Asn Ala Val Leu Ala Glu Ala Met Ser Gln Val Asn Arg Ile Leu
165 170 175

Gln Gln Leu Leu Phe Ile Asn Ala Ala Ala Cys Pro Lys Val Ser Phe
180 185 190

Glu Pro Ile Lys Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Lys
195 200 205

Ala Ala His Pro Val His Ala Gly Pro Ile Ala Asn Ala Ala Ala Tyr
210 215 220

Pro Leu Ala Ser Leu Arg Ser Leu Phe Asn Ala Ala Ala Thr Thr Leu
225 230 235 240

Phe Cys Ala Ser Asp Ala Lys Asn Lys Leu Val Gly Lys Leu Asn Trp
245 250 255

Ala Asn Ala Ala Ala Phe Pro Val Arg Pro Gln Val Pro Leu Asn Met
260 265 270

Thr Asn Asn Pro Pro Ile Pro Val
275 280

<210> 228
<211> 843
<212> DNA
<213> Human immunodeficiency virus

<400> 228
atggggatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatcc 60

agaggaatcc ccattcacta ctgcgcccct gctaaggcag ccaaaatcca gaacttcagg 120

gtgtattaca gaaaggctgc agtcaccatt aaaatcggcg gacaactgaa gaaagccaag 180

tttgtggccg cttggacact caaggccgct gcaaaggtcc cactgcagct ccccccctctg 240

aaggccatct tccagagctc catgactaag aaactgaccc cactgtgtgt gacactcggg 300

gcccagatgg ctgtgttcat ccataatttt aaaggcgcca aggtctacct ggcttgggtg 360

cccgcacaca agaacgccat tccttacaat ccacagtctc aaggagtggt caaagctatt 420

ctgaaggagc ccgtgcacgg ggtgggcgcc gctgcactca ctttcggatg gtgctttaaa 480

ctgaacgccg tgctggctga agccatgagc caggtcaatc ggatcctgca gcaactgctc 540

ttcattaacg ccgctgcatg tcctaaggtg tccttcgagc caatcaaagt gaccgtgtat 600

tacggggtcc ccgtgtggaa gaaagccgct catcctgtcc acgcaggccc aatcgccaac 660

gccgctgcat atcccctcgc ctctctgcgc agcctgttta acgccgctgc aacaaccctc 720

ttttgcgcct ccgacgctaa gaataaactg gtgggaaagc tgaactgggc caacgcagct 780

gcattccctg tgaggccaca ggtccccctc aatatgacta acaatccccc tatcccagtg 840

tga 843

<210> 229
<211> 211
<212> PRT
<213> Human immunodeficiency virus

<400> 229

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Lys Leu Val Gly Lys Leu Asn Trp Ala Met Ala Ser
20 25 30

Asp Phe Asn Leu Pro Pro Val Ala Ile Phe Gln Ser Ser Met Thr Lys
35 40 45

Val Thr Ile Lys Ile Gly Gly Gln Leu Lys Arg Ile Leu Gln Gln Leu
50 55 60

Leu Phe Ile Met Ala Val Phe Ile His Asn Phe Lys Ile Pro Tyr Asn
65 70 75 80

Pro Gln Ser Gln Gly Val Val Thr Thr Leu Phe Cys Ala Ser Asp Ala
85 90 95

Lys Ile Leu Lys Glu Pro Val His Gly Val Gln Met Ala Val Phe Ile
100 105 110

His Asn Phe Lys Gly Ala Ala Val Phe Ile His Asn Phe Lys Arg Cys
115 120 125

Pro Lys Val Ser Phe Glu Pro Ile Lys Ile Gln Asn Phe Arg Val Tyr
130 135 140

Tyr Arg Leu Thr Phe Gly Trp Cys Phe Lys Leu Gln Val Pro Leu Arg
145 150 155 160

Pro Met Thr Tyr Lys Met Thr Asn Asn Pro Pro Ile Pro Val Thr Val
165 170 175

Tyr Tyr Gly Val Pro Val Trp Lys Val Leu Ala Glu Ala Met Ser Gln
180 185 190

Val Ile Pro Ile His Tyr Cys Ala Pro Ala Lys Leu Thr Pro Leu Cys
195 200 205

Val Thr Leu
210

<210> 230
<211> 633
<212> DNA
<213> Human immunodeficiency virus

<400> 230
atgcaggtgc agatccagag cctgtttctg ctcctcctgt gggtgcccgg atccagagga 60

aagctggtgg ggaagctgaa ctgggccatg gccagcgatt tcaacctgcc ccccgtggcc 120

atcttccaga gcagcatgac caaggtgacc atcaagatcg gggggcagct gaagaggatc 180

ctgcagcagc tgctgttcat catggccgtg ttcatccaca acttcaagat cccctacaac 240

ccccagagcc agggggtggt gaccaccctg ttctgcgcca gcgatgccaa gatcctgaag 300

gagcccgtgc acggggtgca gatggccgtg ttcatccaca acttcaaggg cgccgccgtg 360

ttcatccaca acttcaagag gtgccccaag gtgagcttcg agcccatcaa gatccagaac 420

ttcagggtgt actacaggct gaccttcggg tggtgcttca agctgcaggt gcccctgagg 480

cccatgacct acaagatgac caacaacccc cccatccccg tgaccgtgta ctacggggtg 540

cccgtgtgga aggtgctggc cgaggccatg agccaggtga tccccatcca ctactgcgcc 600

cccgccaagc tgacccccct gtgcgtgacc ctg 633

<210> 231
<211> 585
<212> PRT
<213> Human immunodeficiency virus

<400> 231

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Tyr Trp Gln Ala Thr Trp Ile Pro Glu Trp

```
            20                  25                  30

Lys Ala Ile Phe Gln Ser Ser Met Thr Lys Lys Val Tyr Leu Ala Trp
        35                  40                  45

Val Pro Ala His Lys Asn Ala Ala Cys Pro Lys Val Ser Phe Glu Pro
    50                  55                  60

Ile Lys His Pro Val His Ala Gly Pro Ile Ala Asn Leu Thr Phe Gly
65                  70                  75                  80

Trp Cys Phe Lys Leu Asn Lys Met Ile Gly Gly Ile Gly Gly Phe Ile
                85                  90                  95

Lys Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Ala Ala Ala Arg Ile
            100                 105                 110

Leu Gln Gln Leu Leu Phe Ile Asn Thr Thr Leu Phe Cys Ala Ser Asp
        115                 120                 125

Ala Lys Asn Gln Met Val His Gln Ala Ile Ser Pro Arg Gly Ala Lys
    130                 135                 140

Leu Val Gly Lys Leu Asn Trp Ala Gly Ala Ala Ala Ile Tyr Glu Thr
145                 150                 155                 160

Tyr Gly Asp Thr Trp Lys Ala Ala Gln Val Pro Leu Arg Pro Met Thr
                165                 170                 175

Tyr Lys Gly Ala Ala Ala Val Thr Val Leu Asp Val Gly Asp Ala Tyr
            180                 185                 190

Asn Ala Ala Ala Arg Tyr Leu Lys Asp Gln Gln Leu Leu Asn Thr Leu
        195                 200                 205

Asn Phe Pro Ile Ser Pro Ile Asn Met Thr Asn Asn Pro Pro Ile Pro
    210                 215                 220

Val Asn Ala Pro Tyr Asn Thr Pro Val Phe Ala Ile Lys Ala Ala Ala
225                 230                 235                 240

Val Pro Leu Gln Leu Pro Pro Leu Lys Ala Ala Ile Pro Tyr Asn Pro
                245                 250                 255

Gln Ser Gln Gly Val Val Lys Ala Leu Leu Gln Leu Thr Val Trp Gly
            260                 265                 270
```

```
Ile Gly Ala Ala Ile Leu Lys Glu Pro Val His Gly Val Asn Ala Ala
        275                 280                 285

Ala Phe Pro Ile Ser Pro Ile Glu Thr Val Lys Val Trp Lys Glu Ala
    290                 295                 300

Thr Thr Thr Leu Phe Lys Ala Ala Ala Val Thr Ile Lys Ile Gly Gly
305                 310                 315                 320

Gln Leu Lys Lys Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Ala Ala
                325                 330                 335

Ala Val Leu Ala Glu Ala Met Ser Gln Val Asn Leu Val Gly Pro Thr
            340                 345                 350

Pro Val Asn Ile Gly Ala Ala Ala Glu Val Asn Ile Val Thr Asp Ser
        355                 360                 365

Gln Tyr Lys Ala Ala Ala Ile Pro Ile His Tyr Cys Ala Pro Ala Lys
    370                 375                 380

Ala Val Ile Tyr Gln Tyr Met Asp Asp Leu Tyr Lys Ala Ala Ala Gln
385                 390                 395                 400

Met Ala Val Phe Ile His Asn Phe Lys Asn Ala Ala Thr Tyr Gln Ile
                405                 410                 415

Tyr Gln Glu Pro Phe Lys Pro Tyr Asn Glu Trp Thr Leu Glu Leu Lys
            420                 425                 430

Ala Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Lys Ala Phe Pro Val
        435                 440                 445

Arg Pro Gln Val Pro Leu Gly Ala Ala Ala Ile Trp Gly Cys Ser Gly
    450                 455                 460

Lys Leu Ile Lys Val Met Ile Val Trp Gln Val Asp Arg Asn Ala Ala
465                 470                 475                 480

Lys Ala Ala Cys Trp Trp Ala Gly Ile Lys Ala Lys Phe Val Ala Ala
                485                 490                 495

Trp Thr Leu Lys Ala Ala Ala Lys Leu Thr Pro Leu Cys Val Thr Leu
            500                 505                 510

Asn Ala Ala Met Ala Ser Asp Phe Asn Leu Pro Pro Val Lys Ser Leu
        515                 520                 525
```

Leu Asn Ala Thr Asp Ile Ala Val Asn Val Thr Val Tyr Tyr Gly Val
530 535 540

Pro Val Trp Lys Lys Ala Ala Ala Ala Ile Ile Arg Ile Leu Gln Gln
545 550 555 560

Leu Lys Arg Ala Met Ala Ser Asp Phe Asn Leu Asn Ala Ala Ala Tyr
565 570 575

Pro Leu Ala Ser Leu Arg Ser Leu Phe
580 585

<210> 232
<211> 1758
<212> DNA
<213> Human immunodeficiency virus

<400> 232
atggggatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatct 60

agaggatact ggcaagctac ttggattcca gaatggaaag ctatctttca atcctcaatg 120

acgaagaagg tatacctggc atgggtccca gcacacaaga acgccgcttg cccaaaggtg 180

tcctttgaac ccattaaaca cccagtgcac gcagggccaa tagcgaattt gacattcggg 240

tggtgcttca aactaaacaa aatgatcggc ggcattggag gctttatcaa gtttagagat 300

tacgtggacc gattctataa agccgctgcc cgtatactcc agcagctact attcatcaac 360

accactctct tctgcgcttc agacgctaag aaccaaatgg tacaccaagc cataagccct 420

agaggagcca agctcgtagg gaaattaaat tgggcgggtg cagcagcaat ctacgagact 480

tacggcgata cctggaaagc agcccaggtt ccgttacgcc caatgaccta taaaggcgca 540

gcagcagtaa cagttctaga tgtaggagac gcttacaacg ctgccgcaag atacctaaaa 600

gatcagcagt tactcaacac actaaatttc ccaattagcc cgataaacat gacaaataac 660

ccaccaattc ccgtcaatgc tccctacaac actccagtat tcgcaatcaa agccgctgct 720

gtccccctgc agctccctcc tctgaaagct gcgatacctt acaacccaca gagccaaggt 780

gttgtcaaag cactgcttca gctaacagtt tggggaattg gtgctgcaat tctaaaagag 840

ccagttcatg gggttaacgc cgccgccttc ccaatcagtc ctattgagac tgtgaaagta 900

tggaaagaag ccacaaccac acttttaag gcagccgcag ttacaattaa aatagggggc 960

caacttaaga aaatatacca ggaacctttc aagaatctca aagccgctgc agtgctcgcc 1020

gaggctatgt cacaggtgaa tttggtcgga ccaacacccg taaacatcgg agccgcagcc 1080

gaagtgaaca tagtcaccga ctcacagtac aaagccgctg caatacccat acattattgt 1140

gctcccgcaa aggccgtgat ctatcaatat atggacgacc tgtataaggc cgccgcgcag 1200

atggcagtct ttatccacaa ctttaaaaac gcagctactt atcagatcta ccaggaacca 1260

ttcaaaccgt acaatgagtg gaccttggaa ctaaaggcca aaattcagaa cttcagggta 1320

tattatagaa aagcatttcc agtgaggccc caggtgcctc tgggtgccgc agcaatatgg 1380

ggatgttctg gaaaactgat caaggtgatg attgtatggc aagtggacag aaatgcagct 1440

aaggcagcct gttggtgggc aggtataaaa gcaaagttcg tggcagcatg gacgcttaaa 1500

gcagccgcaa aactcactcc tctctgcgtg acacttaatg cagccatggc ctctgatttc 1560

aaccttcccc ctgtaaaatc cctgcttaat gcgacagata tcgcagtcaa cgtaacagta 1620

tattatggcg tgccagtctg gaaaaaagcc gccgcggcca taattcggat actgcagcag 1680

ctgaaaagag ctatggcgag tgacttcaac ctgaatgcgg ccgcctaccc cttggcatcg 1740

ttaaggtcac tattttga 1758

<210> 233
<211> 255
<212> PRT
<213> Hepatitis C virus

<400> 233

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Leu Leu Phe Asn Ile Leu Gly Gly Trp Val
20 25 30

Asp Leu Met Gly Tyr Ile Pro Leu Val Tyr Leu Val Ala Tyr Gln Ala
35 40 45

Thr Val Ile Leu Ala Gly Tyr Gly Ala Gly Val Arg Leu Ile Val Phe
50 55 60

Pro Asp Leu Gly Val His Met Trp Asn Phe Ile Ser Gly Ile Tyr Leu
65 70 75 80

Leu Pro Arg Arg Gly Pro Arg Leu Tyr Leu Val Thr Arg His Ala Asp
85 90 95

Val Val Leu Val Gly Gly Val Leu Ala Ala Leu Leu Phe Leu Leu Leu
100 105 110

Ala Asp Ala Phe Leu Leu Leu Ala Asp Ala Arg Val Trp Met Asn Arg
115 120 125

Leu Ile Ala Phe Ala Cys Thr Cys Gly Ser Ser Asp Leu Tyr Leu Ser
130 135 140

```
Ala Phe Ser Leu His Ser Tyr Gly Val Ala Gly Ala Leu Val Ala Phe
145                 150                 155                 160

Lys Leu Pro Gly Cys Ser Phe Ser Ile Phe Lys Thr Ser Glu Arg Ser
                165                 170                 175

Gln Pro Arg Leu Ile Phe Cys His Ser Lys Lys Lys Phe Trp Ala Lys
            180                 185                 190

His Met Trp Asn Phe Ile Pro Phe Tyr Gly Lys Ala Ile Arg Met Tyr
        195                 200                 205

Val Gly Gly Val Glu His Arg Gln Leu Phe Thr Phe Ser Pro Arg Arg
    210                 215                 220

Arg Leu Gly Val Arg Ala Thr Arg Lys Val Gly Ile Tyr Leu Leu Pro
225                 230                 235                 240

Asn Arg Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala
                245                 250                 255
```

<210> 234
<211> 747
<212> DNA
<213> Hepatitis C virus

<400> 234
gaattcgccg ccaccatgca ggtgcagatc cagagcctgt ttctgctcct cctgtgggtg 60

cccggatcca gaggactgct gttcaacatc ctgggggggt gggtggatct gatggggtac 120

atccccctgg tgtacctggt ggcctaccag gccaccgtga tcctggccgg gtacggggcc 180

ggggtgaggc tgatcgtgtt ccccgatctg ggggtgcaca tgtggaactt catcagcggg 240

atctacctgc tgcccaggag aggacctaga ctgtacctgg tgactagaca cgctgatgtg 300

gtgctggtgg gaggagtgct ggctgctctg ctgtttctgc tgctggctga tgctttcctg 360

ctgctggctg atgctagagt gtggatgaac agactgatcg ctttcgcttg tacatgtgga 420

agctccgatc tgtatctgag cgctttcagc ctgcacagct acggagtggc tggagctctg 480

gtggctttta agctgcctgg atgtagcttt agcatcttta agaccagcga aagaagccag 540

cctagactga tcttttgtca cagcaagaag aagttttggg ctaagcacat gtggaatttt 600

atcccttttct atggaaaggc tatcagaatg tatgtgggag gagtggaaca cagacagctg 660

tttacattta gccctagaag gagactggga gtgagagcta caagaaaggt gggaatctat 720

ctgctgccta atagatgaaa gcttggg 747

<210> 235
<211> 281
<212> PRT
<213> Hepatitis C virus

<400> 235

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Asp Leu Met Gly Tyr Ile Pro Leu Val Ala
20 25 30

Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Leu Leu Phe Leu
35 40 45

Leu Leu Ala Asp Ala Leu Ile Phe Cys His Ser Lys Lys Lys Gln Leu
50 55 60

Phe Thr Phe Ser Pro Arg Arg Tyr Leu Val Thr Arg His Ala Asp Val
65 70 75 80

Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Cys Thr Cys Gly Ser Ser
85 90 95

Asp Leu Tyr His Met Trp Asn Phe Ile Ser Gly Ile Phe Trp Ala Lys
100 105 110

His Met Trp Asn Phe Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala
115 120 125

Ala Ala Ile Leu Ala Gly Tyr Gly Ala Gly Val Tyr Leu Val Ala Tyr
130 135 140

Gln Ala Thr Val Gly Val Ala Gly Ala Leu Val Ala Phe Lys Ile Pro
145 150 155 160

Phe Tyr Gly Lys Ala Ile Arg Met Tyr Val Gly Gly Val Glu His Arg
165 170 175

Val Leu Val Gly Gly Val Leu Ala Ala Phe Leu Leu Leu Ala Asp Ala
180 185 190

Arg Val Leu Pro Gly Cys Ser Phe Ser Ile Phe Ala Lys Phe Val Ala
195 200 205

Ala Trp Thr Leu Lys Ala Ala Ala Lys Thr Ser Glu Arg Ser Gln Pro
210 215 220

```
Arg Arg Leu Gly Val Arg Ala Thr Arg Lys Arg Leu Ile Val Phe Pro
225                 230                 235                 240

Asp Leu Gly Val Trp Met Asn Arg Leu Ile Ala Phe Ala Leu Ser Ala
                245                 250                 255

Phe Ser Leu His Ser Tyr Leu Leu Phe Asn Ile Leu Gly Gly Trp Val
            260                 265                 270

Val Gly Ile Tyr Leu Leu Pro Asn Arg
        275                 280
```

<210> 236
<211> 789
<212> DNA
<213> Hepatitis C virus

<400> 236

```
gaattcgccg ccaccatggg aatgcaggtg cagatccaga gcctgtttct gctcctcctg     60

tgggtgcccg gatccagagg agatctgatg ggatatatcc ctctggtggc taagtttgtg    120

gctgcttgga cactgaaggc tgctgctctg ctgtttctgc tgctggctga tgctctgatc    180

ttctgtcaca gcaagaagaa gcagctgttt acatttagcc caagaagata tctggtgaca    240

agacacgctg atgtgtatct gctgcctaga cgcggaccta gactgtgtac atgtggaagc    300

tccgatctgt atcacatgtg gaactttatc agcggaatct tttgggctaa gcacatgtgg    360

aatttcatcc tggctggata tggagctgga gtgtatctgg tggcttatca ggctacagtg    420

ggagtggctg gagctctggt ggctttcaag atcccattct atggaaaggc tatcagaatg    480

tatgtgggag gagtggaaca cagagtgctg gtgggaggag tgctggctgc tttcctgctg    540

ctggctgatg ctagagtgct gccaggatgt agctttagca tcttcaagac ttccgaacgc    600

tcccagccta gaagactggg agtgagagct acaaggaaga gactgatcgt gtttccagat    660

ctgggagtgt ggatgaatag actgatcgct ttcgctctga gcgctttcag cctgcacagc    720

tatctgctgt tcaacatcct gggaggatgg gtggtgggaa tctatctgct gccaaacaga    780

tgaaagctt                                                            789
```

<210> 237
<211> 107
<212> PRT
<213> Hepatitis C virus

<400> 237

```
Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                   10                  15
```

```
Val Pro Gly Ser Arg Gly Tyr Leu Val Ala Tyr Gln Ala Thr Val Ala
            20                  25                  30

Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Leu Leu Phe Leu
        35                  40                  45

Leu Leu Ala Asp Ala Leu Ile Phe Cys His Ser Lys Lys Lys Tyr Leu
    50                  55                  60

Val Thr Arg His Ala Asp Val Leu Gly Phe Gly Ala Tyr Met Ser Lys
65                  70                  75                  80

Cys Thr Cys Gly Ser Ser Asp Leu Tyr His Met Trp Asn Phe Ile Ser
                85                  90                  95

Gly Ile Phe Trp Ala Lys His Met Trp Asn Phe
            100                 105
```

<210> 238
<211> 345
<212> DNA
<213> Hepatitis C virus

<400> 238

```
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg     60

tgggtgcccg gatccagagg atacctcgtc gcctaccagg ccactgtggc taaattcgtg    120

gcagcctgga cactgaaagc tgcagctctg ctcttcctgc tcctggccga tgcactcatc    180

ttctgccatt ccaagaaaaa gtatctggtc accagacatg ctgacgtgct ggggtttggc    240

gcctacatga gcaagtgcac ctgtggcagc tccgacctgt atcacatgtg gaactttatt    300

tctggaatct tttgggccaa gcacatgtgg aatttctgaa agctt                    345
```

<210> 239
<211> 106
<212> PRT
<213> Hepatitis C virus

<400> 239

```
Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                   10                  15

Val Pro Gly Ser Arg Gly Val Leu Val Gly Gly Val Leu Ala Ala Ala
            20                  25                  30

Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu Leu Leu
        35                  40                  45
```

```
Ala Asp Ala Arg Val Leu Ser Ala Phe Ser Leu His Ser Tyr Ile Leu
    50                  55                  60

Ala Gly Tyr Gly Ala Gly Val Trp Met Asn Arg Leu Ile Ala Phe Ala
65                  70                  75                  80

Ile Pro Phe Tyr Gly Lys Ala Ile Val Ala Gly Ala Leu Val Ala Phe
                85                  90                  95

Lys Val Gly Ile Tyr Leu Leu Pro Asn Arg
            100                 105
```

<210> 240
<211> 342
<212> DNA
<213> Hepatitis C virus

<400> 240

```
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg     60

tgggtgcccg gatccagagg agtcctggtg ggcggcgtcc tggccgctgc taagtttgtc    120

gctgcttgga cactgaaggc agccgctttc ctgctcctgg cagacgccag ggtgctgtct    180

gccttcagcc tccactccta catcctcgca gggtatggcg caggcgtgtg gatgaatcgg    240

ctgatcgcct ttgccattcc attctatggg aaagccattg tggctggcgc cctggtggca    300

ttcaaggtcg ggatctacct cctgcctaac cgctgaaagc tt                       342
```

<210> 241
<211> 80
<212> PRT
<213> Hepatitis C virus

<400> 241

```
Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                   10                  15

Val Pro Gly Ser Arg Gly Val Leu Val Gly Gly Val Leu Ala Ala Ala
            20                  25                  30

Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu Leu Leu
        35                  40                  45

Ala Asp Ala Arg Val Leu Ser Ala Phe Ser Leu His Ser Tyr Ile Leu
    50                  55                  60

Ala Gly Tyr Gly Ala Gly Val Trp Met Asn Arg Leu Ile Ala Phe Ala
65                  70                  75                  80
```

<210> 242
<211> 264
<212> DNA
<213> Hepatitis C virus

<400> 242
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg 60

tgggtgcccg gatccagagg agtcctggtg ggcggcgtcc tggccgctgc taagtttgtc 120

gctgcttgga cactgaaggc agccgctttc ctgctcctgg cagacgccag ggtgctgtct 180

gccttcagcc tccactccta catcctcgca gggtatggcg caggcgtgtg gatgaatcgg 240

ctgatcgcct ttgcctgagg atcc 264

<210> 243
<211> 130
<212> PRT
<213> Hepatitis C virus

<400> 243

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Asp Leu Met Gly Tyr Ile Pro Leu Val Ala
20 25 30

Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Arg Leu Gly Val
35 40 45

Arg Ala Thr Arg Lys Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Arg
50 55 60

Met Tyr Val Gly Gly Val Glu His Arg Arg Leu Ile Val Phe Pro Asp
65 70 75 80

Leu Gly Val Gly Val Ala Gly Ala Leu Val Ala Phe Lys Leu Pro Gly
85 90 95

Cys Ser Phe Ser Ile Phe Lys Thr Ser Glu Arg Ser Gln Pro Arg Gln
100 105 110

Leu Phe Thr Phe Ser Pro Arg Arg Tyr Leu Leu Pro Arg Arg Gly Pro
115 120 125

Arg Leu
130

<210> 244
<211> 414

<212> DNA
<213> Hepatitis C virus

<400> 244
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg 60

tgggtgcccg gatccagagg agacctgatg ggctacatcc ctctcgtggc caagtttgtg 120

gcagcttgga ccctgaaggc cgctgccaga ctgggagtgc gcgctacacg gaaactcctg 180

tttaacatcc tgggagggtg ggtgcggatg tacgtcggag gcgtcgagca cagaaggctc 240

attgtctttc cagatctcgg cgtgggcgtc gcaggcgcac tcgtggcctt caaactgcca 300

gggtgcagct tcagcatttt caagacctcc gaacgctccc aacccagaca gctgttcact 360

ttctctcctc ggaggtatct gctgcccaga cgcggaccca ggctgtgaaa gctt 414

<210> 245
<211> 98
<212> PRT
<213> Hepatitis C virus

<400> 245

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Leu Leu Phe Asn Ile Leu Gly Gly Trp Val
20 25 30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Leu Ala
35 40 45

Asp Gly Gly Cys Ser Gly Gly Ala Tyr Arg Leu Ile Val Phe Pro Asp
50 55 60

Leu Gly Val Lys Phe Trp Ala Lys His Met Trp Asn Phe Ile Gly Val
65 70 75 80

Ala Gly Ala Leu Val Ala Phe Lys Lys Gln Leu Phe Thr Phe Ser Pro
85 90 95

Arg Arg

<210> 246
<211> 318
<212> DNA
<213> Hepatitis C virus

<400> 246
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg 60

tgggtgcccg gatccagagg actgctcttc aacatcctgg gcggatgggt gaaggccaag 120

ttcgtggctg cctggaccct gaaggctgcc gctctggccg acgggggatg cagcggcgga 180

gcttacaggc tcattgtctt tcccgatctc ggagtcaaat tttgggcaaa gcacatgtgg 240

aatttcatcg gggtggccgg agccctggtc gcttttaaaa agcagctctt caccttctcc 300

ccaagacggt gaggtacc 318

<210> 247
<211> 107
<212> PRT
<213> Hepatitis C virus

<400> 247

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Arg Leu Gly Val Arg Ala Thr Arg Lys Lys
20 25 30

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys Thr Ser
35 40 45

Glu Arg Ser Gln Pro Arg Asn Leu Pro Gly Cys Ser Phe Ser Ile Phe
50 55 60

Asn Asp Leu Met Gly Tyr Ile Pro Leu Val Lys Tyr Leu Leu Pro Arg
65 70 75 80

Arg Gly Pro Arg Leu Asn Thr Leu Cys Gly Phe Ala Asp Leu Met Gly
85 90 95

Tyr Arg Met Tyr Val Gly Gly Val Glu His Arg
100 105

<210> 248
<211> 345
<212> DNA
<213> Hepatitis C virus

<400> 248
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg 60

tgggtgcccg gatccagagg aaggctgggc gtgagagcca cccggaagaa ggccaagttc 120

gtggctgcct ggaccctgaa ggctgccgct aaaacaagcg agcgctccca gcccaggaac 180

ctgcctggat gctctttcag catctttaat gacctcatgg ggtacattcc actggtgaag 240

tatctgctcc ccagacgggg ccctcgcctg aacactctct gtggatttgc tgatctgatg 300

gggtacagga tgtatgtcgg cggagtcgaa cacagatgag gtacc 345

<210> 249
<211> 308
<212> PRT
<213> Hepatitis C virus

<400> 249

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Val Leu Val Gly Gly Val Leu Ala Ala Ala
20 25 30

Phe Leu Leu Leu Ala Asp Ala Arg Val Leu Ser Ala Phe Ser Leu His
35 40 45

Ser Tyr Ile Leu Ala Gly Tyr Gly Ala Gly Val Trp Met Asn Arg Leu
50 55 60

Ile Ala Phe Ala Gly Ala Ala Ala Arg Leu Gly Val Arg Ala Thr Arg
65 70 75 80

Lys Lys Ala Ala Ala Lys Thr Ser Glu Arg Ser Gln Pro Arg Asn Leu
85 90 95

Pro Gly Cys Ser Phe Ser Ile Phe Asn Asp Leu Met Gly Tyr Ile Pro
100 105 110

Leu Val Lys Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Asn Thr Leu
115 120 125

Cys Gly Phe Ala Asp Leu Met Gly Tyr Arg Met Tyr Val Gly Gly Val
130 135 140

Glu His Arg Lys Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Lys Ala
145 150 155 160

Ala Ala Leu Ala Asp Gly Gly Cys Ser Gly Gly Ala Tyr Arg Leu Ile
165 170 175

Val Phe Pro Asp Leu Gly Val Lys Phe Trp Ala Lys His Met Trp Asn
180 185 190

Phe Ile Gly Val Ala Gly Ala Leu Val Ala Phe Lys Lys Gln Leu Phe
195 200 205

```
Thr Phe Ser Pro Arg Arg Asn Gly Tyr Leu Val Ala Tyr Gln Ala Thr
    210                 215                 220

Val Ala Ala Ala Leu Leu Phe Leu Leu Leu Ala Asp Ala Leu Ile Phe
225                 230                 235                 240

Cys His Ser Lys Lys Lys Tyr Leu Val Thr Arg His Ala Asp Val Leu
                245                 250                 255

Gly Phe Gly Ala Tyr Met Ser Lys Cys Thr Cys Gly Ser Ser Asp Leu
            260                 265                 270

Tyr His Met Trp Asn Phe Ile Ser Gly Ile Phe Trp Ala Lys His Met
        275                 280                 285

Trp Asn Phe Lys Ala Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu
    290                 295                 300

Lys Ala Ala Ala
305
```

<210> 250
<211> 948
<212> DNA
<213> Hepatitis C virus

<400> 250

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gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg     60

tgggtgcccg gctccagagg agtcctggtg ggcggcgtcc tggcagccgc tttcctgctc    120

ctggcagacg ccagggtgct gtctgccttc agcctccact cctacatcct cgcagggtat    180

ggcgcaggcg tgtggatgaa tcggctgatc gcctttgccg gcgctgccgc aaggctgggc    240

gtgagagcca cccggaagaa ggctgccgct aaaacaagcg agcgctccca gcccaggaac    300

ctgcctggat gctctttcag catctttaat gacctcatgg ggtacattcc actggtgaag    360

tatctgctcc ccagacgggg ccctcgcctg aacactctct gtggatttgc tgatctgatg    420

gggtacagga tgtatgtcgg cggagtcgaa cacagaaaac tgctcttcaa catcctgggc    480

ggatgggtga aggctgccgc tctggccgac gggggatgca gcggcggagc ttacaggctc    540

attgtctttc ccgatctcgg agtcaaattt tgggcaaagc acatgtggaa tttcatcggg    600

gtggccggag ccctggtcgc ttttaaaaag cagctcttca ccttctcccc aagacggaac    660

ggatacctcg tcgcctacca ggccactgtg gctgcagctc tgctcttcct gctcctggcc    720

gatgcactca tcttctgcca ttccaagaaa aagtatctgg tcaccagaca tgctgacgtg    780

ctggggtttg gcgcctacat gagcaagtgc acctgtggca gctccgacct gtatcacatg    840
```

tggaacttta tttctggaat cttttgggcc aagcacatgt ggaattttaa ggccgcagca 900

gctaaattcg tggcagcctg gacactgaaa gcagctgcat gaggatcc 948

<210> 251
<211> 308
<212> PRT
<213> Hepatitis C virus

<400> 251

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Arg Leu Gly Val Arg Ala Thr Arg Lys Lys
20 25 30

Ala Ala Ala Lys Thr Ser Glu Arg Ser Gln Pro Arg Asn Leu Pro Gly
35 40 45

Cys Ser Phe Ser Ile Phe Asn Asp Leu Met Gly Tyr Ile Pro Leu Val
50 55 60

Lys Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Asn Thr Leu Cys Gly
65 70 75 80

Phe Ala Asp Leu Met Gly Tyr Arg Met Tyr Val Gly Gly Val Glu His
85 90 95

Arg Lys Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Lys Ala Ala Ala
100 105 110

Leu Ala Asp Gly Gly Cys Ser Gly Gly Ala Tyr Arg Leu Ile Val Phe
115 120 125

Pro Asp Leu Gly Val Lys Phe Trp Ala Lys His Met Trp Asn Phe Ile
130 135 140

Gly Val Ala Gly Ala Leu Val Ala Phe Lys Lys Gln Leu Phe Thr Phe
145 150 155 160

Ser Pro Arg Arg Asn Gly Tyr Leu Val Ala Tyr Gln Ala Thr Val Ala
165 170 175

Ala Ala Leu Leu Phe Leu Leu Leu Ala Asp Ala Leu Ile Phe Cys His
180 185 190

Ser Lys Lys Lys Tyr Leu Val Thr Arg His Ala Asp Val Leu Gly Phe
195 200 205

Gly Ala Tyr Met Ser Lys Cys Thr Cys Gly Ser Ser Asp Leu Tyr His
210 215 220

Met Trp Asn Phe Ile Ser Gly Ile Phe Trp Ala Lys His Met Trp Asn
225 230 235 240

Phe Lys Lys Ala Ala Ala Val Leu Val Gly Gly Val Leu Ala Ala Ala
245 250 255

Phe Leu Leu Leu Ala Asp Ala Arg Val Leu Ser Ala Phe Ser Leu His
260 265 270

Ser Tyr Ile Leu Ala Gly Tyr Gly Ala Gly Val Trp Met Asn Arg Leu
275 280 285

Ile Ala Phe Ala Asn Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu
290 295 300

Lys Ala Ala Ala
305

<210> 252
<211> 948
<212> DNA
<213> Hepatitis C virus

<400> 252
gaattcgccg ccaccatggg aatgcaggtg cagatccaaa gcctgtttct gctcctcctg 60

tgggtgcccg gctccagagg aaggctgggc gtgagagcca cccggaagaa ggctgccgct 120

aaaacaagcg agcgctccca gcccaggaac ctgcctggat gctctttcag catctttaat 180

gacctcatgg ggtacattcc actggtgaag tatctgctcc ccagacgggg ccctcgcctg 240

aacactctct gtggatttgc tgatctgatg gggtacagga tgtatgtcgg cggagtcgaa 300

cacagaaaac tgctcttcaa catcctgggc ggatgggtga aggctgccgc tctggccgac 360

gggggatgca gcggcggagc ttacaggctc attgtctttc ccgatctcgg agtcaaattt 420

tgggcaaagc acatgtggaa tttcatcggg gtggccggag ccctggtcgc ttttaaaaag 480

cagctcttca ccttctcccc aagacggaac ggatacctcg tcgcctacca ggccactgtg 540

gctgcagctc tgctcttcct gctcctggcc gatgcactca tcttctgcca ttccaagaaa 600

aagtatctgg tcaccagaca tgctgacgtg ctggggtttg gcgcctacat gagcaagtgc 660

acctgtggca gctccgacct gtatcacatg tggaacttta tttctggaat cttttgggcc 720

aagcacatgt ggaattttaa gaaagccgct gcagtcctgg tgggcggcgt cctggcagcc 780

gctttcctgc tcctggcaga cgccagggtg ctgtctgcct tcagcctcca ctcctacatc 840

ctcgcagggt atggcgcagg cgtgtggatg aatcggctga tcgcctttgc caatgctgca 900

gctaaattcg tggcagcctg gacactgaaa gcagctgcat gaggatcc 948

<210> 253
<211> 123
<212> PRT
<213> Unknown

<220>
<223> AOSI.K

<400> 253

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
20 25 30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
35 40 45

Pro Ser Asp Phe Phe Pro Ser Val Lys Phe Leu Leu Ser Leu Gly Ile
50 55 60

His Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr
65 70 75 80

Val Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu
85 90 95

Pro Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr
100 105 110

Tyr Lys Trp Leu Ser Leu Leu Val Pro Phe Val
115 120

<210> 254
<211> 372
<212> DNA
<213> Unknown

<220>
<223> AOSI.K

<400> 254
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc 60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg 120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgaa gttcctgctg 180

tccctgggaa tccacctgta tatggatgac gtggtgctgg gagtgggact gtccaggtac 240

gtggctaggc tgttcctgct gaccagaatc ctgaccatct ccacctgcc agagaccacc 300

gtggtgagga ggcaggcctt cacctttagc cctacctata agtggctgag cctgctggtg 360

ccctttgtgt ga 372

<210> 255
<211> 206
<212> PRT
<213> Hepatitis B virus

<400> 255

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
20 25 30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
35 40 45

Pro Ser Asp Phe Phe Pro Ser Val Phe Leu Leu Ser Leu Gly Ile His
50 55 60

Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr Val
65 70 75 80

Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu Pro
85 90 95

Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr Tyr
100 105 110

Lys Trp Leu Ser Leu Leu Val Pro Phe Val Ile Pro Ile Pro Ser Ser
115 120 125

Trp Ala Phe Thr Pro Ala Arg Val Thr Gly Gly Val Phe Lys Val Gly
130 135 140

Asn Phe Thr Gly Leu Tyr Leu Pro Ser Asp Phe Phe Pro Ser Val Thr
145 150 155 160

Leu Trp Lys Ala Gly Ile Leu Tyr Lys Asn Val Ser Ile Pro Trp Thr
165 170 175

His Lys Leu Val Val Asp Phe Ser Gln Phe Ser Arg Ser Ala Ile Cys
180 185 190

Ser Val Val Arg Arg Ala Leu Met Pro Leu Tyr Ala Cys Ile
195 200 205

<210> 256
<211> 621
<212> DNA
<213> Hepatitis B virus

<400> 256
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc 60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg 120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgtt cctgctgtcc 180

ctgggaatcc acctgtatat ggatgacgtg gtgctgggag tgggactgtc caggtacgtg 240

gctaggctgt tcctgctgac cagaatcctg accatctcca ccctgccaga gaccaccgtg 300

gtgaggaggc aggccttcac ctttagccct acctataagt ggctgagcct gctggtgccc 360

tttgtgatcc ctatccctag ctcctgggct ttcaccccag ccagggtgac cggaggagtg 420

tttaaggtgg gaaacttcac cggcctgtat ctgcccagcg atttctttcc tagcgtgacc 480

ctgtggaagg ccgggatcct gtacaagaat gtgtccatcc cttggaccca caagctggtg 540

gtggactttt cccagttcag cagatccgct atctgctccg tggtgaggag agctctgatg 600

ccactgtatg cctgtatctg a 621

<210> 257
<211> 219
<212> PRT
<213> Hepatitis B virus

<400> 257

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
20 25 30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
35 40 45

Pro Ser Asp Phe Phe Pro Ser Val Asn Phe Leu Leu Ser Leu Gly Ile
50 55 60

His Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr
65 70 75 80

Val Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu

```
                85                  90                  95

Pro Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr
            100                 105                 110

Tyr Lys Gly Ala Ala Ala Trp Leu Ser Leu Leu Val Pro Phe Val Asn
        115                 120                 125

Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Thr Pro Ala Arg Val Thr
    130                 135                 140

Gly Gly Val Phe Lys Val Gly Asn Phe Thr Gly Leu Tyr Asn Leu Pro
145                 150                 155                 160

Ser Asp Phe Phe Pro Ser Val Lys Thr Leu Trp Lys Ala Gly Ile Leu
                165                 170                 175

Tyr Lys Asn Val Ser Ile Pro Trp Thr His Lys Gly Ala Ala Leu Val
            180                 185                 190

Val Asp Phe Ser Gln Phe Ser Arg Asn Ser Ala Ile Cys Ser Val Val
        195                 200                 205

Arg Arg Ala Leu Met Pro Leu Tyr Ala Cys Ile
    210                 215
```

<210> 258
<211> 660
<212> DNA
<213> Hepatitis B virus

<400> 258

```
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc     60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg    120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgaa cttcctgctg    180

tccctgggaa tccacctgta tatggatgac gtggtgctgg gagtgggact gtccaggtac    240

gtggctaggc tgttcctgct gaccagaatc ctgaccatct ccaccctgcc agagaccacc    300

gtggtgagga ggcaggcctt cacctttagc cctacctata agggagccgc tgcctggctg    360

agcctgctgg tgccctttgt gaatatccct atccctagct cctgggcttt caagacccca    420

gccagggtga ccggaggagt gtttaaggtg ggaaacttca ccggcctgta taacctgccc    480

agcgatttct ttcctagcgt gaagaccctg tggaaggccg gaatcctgta caagaatgtg    540

tccatccctt ggacccacaa gggagccgct ctggtggtgg acttttccca gttcagcaga    600

aattccgcta tctgctccgt ggtgaggaga gctctgatgc cactgtatgc ctgtatctga    660
```

<210> 259
<211> 168
<212> PRT
<213> Unknown

<220>
<223> PfCTL.1

<400> 259

```
Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1               5                  10                  15

Gly Ser Arg Gly Ile Leu Ser Val Ser Ser Phe Leu Phe Val Asn Ala
            20                  25                  30

Ala Ala Gln Thr Asn Phe Lys Ser Leu Leu Arg Asn Leu Pro Ser Glu
        35                  40                  45

Asn Glu Arg Gly Tyr Lys Ala Ala Ala Leu Leu Ala Cys Ala Gly Leu
    50                  55                  60

Ala Tyr Lys Lys Ala Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu
65                  70                  75                  80

Lys Ala Ala Ala Lys Ala Phe Met Lys Ala Val Cys Val Glu Val Asn
                85                  90                  95

Ala Ala Ala Ser Phe Leu Phe Val Glu Ala Leu Phe Asn Ala Thr Pro
            100                 105                 110

Tyr Ala Gly Glu Pro Ala Pro Phe Lys Ala Ala Ala Lys Tyr Lys Leu
        115                 120                 125

Ala Thr Ser Val Leu Lys Ala Gly Val Ser Glu Asn Ile Phe Leu Lys
    130                 135                 140

Asn Ala Ala Ala Tyr Phe Ile Leu Val Asn Leu Leu Ile Lys Ala Gly
145                 150                 155                 160

Leu Leu Gly Val Val Ser Thr Val
                165
```

<210> 260
<211> 513
<212> DNA
<213> Unknown

<220>
<223> PfCTL.1

<400> 260
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatcc 60

agaggaatcc tgagcgtgtc ctctttcctg tttgtcaacg ccgctgcaca gaccaatttc 120

aagagcctcc tgaggaacct cccctccgag aacgaaagag gctacaaagc cgctgcactg 180

ctcgcctgcg ctggactggc ctataagaaa gccgctgcag ccaagttcgt ggccgcttgg 240

acactgaagg ccgctgcaaa agcctttatg aaggctgtct gtgtggaggt caatgccgct 300

gcatctttcc tgtttgtgga ggccctcttt aacgctactc cttacgcagg ggaaccagcc 360

cccttcaagg ccgctgcaaa atataagctg gcaaccagcg tgctgaaggc tggcgtgtcc 420

gagaatattt ttctgaaaaa cgccgctgca tacttcatcc tggtgaatct gctcattaag 480

gccggactcc tgggggtggt ctctacagtg tga 513

<210> 261
<211> 157
<212> PRT
<213> Unknown

<220>
<223> PfCTL.2

<400> 261

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Phe Val Glu Ala Leu Phe Gln Glu Tyr Asn Ala Ala
20 25 30

Ala Lys Tyr Leu Val Ile Val Phe Leu Ile Asn Ala Leu Ala Cys Ala
35 40 45

Gly Leu Ala Tyr Lys Lys Phe Tyr Phe Ile Leu Val Asn Leu Leu Lys
50 55 60

Ala Ala Leu Phe Phe Ile Ile Phe Asn Lys Asn Ala Ala Ala Lys Phe
65 70 75 80

Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys Phe Ile Leu Val Asn
85 90 95

Leu Leu Ile Phe His Asn Phe Gln Asp Glu Glu Asn Ile Gly Ile Tyr
100 105 110

Lys Leu Pro Tyr Gly Arg Thr Asn Leu Lys Ala Ala Ala Val Leu Leu
115 120 125

Gly Gly Val Gly Leu Val Leu Asn Phe Leu Ile Phe Phe Asp Leu Phe
130 135 140

Leu Val Lys Ala Val Leu Ala Gly Leu Leu Gly Val Val
145 150 155

<210> 262
<211> 480
<212> DNA
<213> Unknown

<220>
<223> PfCTL.2

<400> 262
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatcc 60

agaggattcg tggaggccct gtttcaggaa tacaacgccg ctgcaaagta tctcgtcatc 120

gtgttcctga tcaatgctct ggcatgcgcc ggcctcgctt acaaaaagtt ttacttcatt 180

ctggtcaacc tgctcaaggc cgctctgttc tttatcattt tcaataaaaa cgccgcagct 240

aagtttgtgg ccgcatggac cctgaaggcc gctgcaaaat tcatcctcgt gaatctgctc 300

atttttcaca acttccaaga cgaggaaaat atcggaattt ataagctgcc ctacgggagg 360

acaaacctga aagccgctgc agtcctgctc ggcggagtgg ggctggtgct caattttctg 420

atcttctttg atctgttcct ggtgaaggcc gtcctggccg gcctgctcgg agtcgtgtga 480

<210> 263
<211> 169
<212> PRT
<213> Unknown

<220>
<223> PfCTL.3

<400> 263

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Val Phe Leu Ile Phe Phe Asp Leu Phe Leu Asn Ala
20 25 30

Ala Ala Pro Ser Asp Gly Lys Cys Asn Leu Tyr Lys Ala Ala Ala Val
35 40 45

Thr Cys Gly Asn Gly Ile Gln Val Arg Lys Leu Phe His Ile Phe Asp
50 55 60

Gly Asp Asn Glu Ile Lys Ala His Val Leu Ser His Asn Ser Tyr Glu
65 70 75 80

Lys Asn Tyr Tyr Gly Lys Gln Glu Asn Trp Tyr Ser Leu Lys Lys Ile
85 90 95

Leu Ser Val Phe Phe Leu Ala Asn Ala Ala Ala Lys Phe Ile Lys Ser
100 105 110

Leu Phe His Ile Phe Lys Ala Ala Ala Leu Tyr Ile Ser Phe Tyr Phe
115 120 125

Ile Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys
130 135 140

Ala Ala Ala Tyr Tyr Ile Pro His Gln Ser Ser Leu Lys Ala Ala Ala
145 150 155 160

Gly Leu Ile Met Val Leu Ser Phe Leu
165

<210> 264
<211> 516
<212> DNA
<213> Unknown

<220>
<223> PfCTL.3

<400> 264
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatcc 60

agaggagtgt tcctgatctt ctttgacctg ttcctgaacg ccgctgcacc cagcgatggc 120

aagtgcaatc tctacaaggc cgctgcagtg acctgtggaa acgggattca ggtcaggaaa 180

ctctttcaca tcttcgacgg cgataacgag atcaaggccc atgtgctgtc ccacaattct 240

tatgaaaaaa actactatgg aaagcaagag aattggtaca gcctgaagaa aattctgtcc 300

gtgttctttc tcgccaacgc cgctgcaaag tttatcaagt ctctgttcca tattttcaag 360

gccgctgcac tctacatcag cttctatttt attaaagcca aatttgtggc cgcttggaca 420

ctgaaggccg ctgcaaaagc cgctgcatac tatatccctc accagagctc cctgaaggcc 480

gctgcagggc tgatcatggt gctctctttc ctgtga 516

<210> 265
<211> 456
<212> PRT
<213> Unknown

<220>
<223> PfCTL/HTL/(N)

<400> 265

```
Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1               5                  10                  15

Gly Ser Arg Gly Ser Ser Val Phe Asn Val Val Asn Ser Ser Ile Gly
            20                  25                  30

Leu Ile Met Val Leu Ser Phe Leu Gly Pro Gly Pro Gly Leu Tyr Ile
        35                  40                  45

Ser Phe Tyr Phe Ile Leu Val Asn Leu Leu Ile Phe His Ile Asn Gly
    50                  55                  60

Lys Ile Ile Lys Asn Ser Glu Gly Pro Gly Pro Gly Pro Asp Ser Ile
65                  70                  75                  80

Gln Asp Ser Leu Lys Glu Ser Arg Lys Leu Ser Gly Pro Gly Pro Gly
                85                  90                  95

Val Leu Ala Gly Leu Leu Gly Val Val Ser Thr Val Leu Leu Gly Gly
            100                 105                 110

Val Gly Leu Val Leu Gly Pro Gly Pro Gly Leu Pro Ser Glu Asn Glu
        115                 120                 125

Arg Gly Tyr Tyr Ile Pro His Gln Ser Ser Leu Gly Pro Gly Pro Gly
    130                 135                 140

Gln Thr Asn Phe Lys Ser Leu Leu Arg Asn Leu Gly Val Ser Glu Asn
145                 150                 155                 160

Ile Phe Leu Lys Gly Pro Gly Pro Gly Phe Gln Asp Glu Glu Asn Ile
                165                 170                 175

Gly Ile Tyr Gly Pro Gly Pro Gly Lys Tyr Leu Val Ile Val Phe Leu
            180                 185                 190

Ile Phe Phe Asp Leu Phe Leu Val Gly Pro Gly Pro Gly Lys Phe Ile
        195                 200                 205

Lys Ser Leu Phe His Ile Phe Asp Gly Asp Asn Glu Ile Gly Pro Gly
    210                 215                 220

Pro Gly Lys Ser Lys Tyr Lys Leu Ala Thr Ser Val Leu Ala Gly Leu
225                 230                 235                 240

Leu Gly Pro Gly Pro Gly Leu Pro Tyr Gly Lys Thr Asn Leu Gly Pro
                245                 250                 255
```

```
Gly Pro Gly Arg His Asn Trp Val Asn His Ala Val Pro Leu Ala Met
            260                 265                 270

Lys Leu Ile Gly Pro Gly Pro Gly Met Arg Lys Leu Ala Ile Leu Ser
        275                 280                 285

Val Ser Ser Phe Leu Phe Val Glu Ala Leu Phe Gln Glu Tyr Gly Pro
    290                 295                 300

Gly Pro Gly Val Thr Cys Gly Asn Gly Ile Gln Val Arg Gly Pro Gly
305                 310                 315                 320

Pro Gly Met Asn Tyr Tyr Gly Lys Gln Glu Asn Trp Tyr Ser Leu Lys
                325                 330                 335

Lys Gly Pro Gly Pro Gly Pro Ser Asp Gly Lys Cys Asn Leu Tyr Ala
            340                 345                 350

Asp Ser Ala Trp Glu Asn Val Lys Asn Val Ile Gly Pro Phe Met Lys
        355                 360                 365

Ala Val Cys Val Glu Val Gly Pro Gly Pro Gly Lys Ile Leu Ser Val
    370                 375                 380

Phe Phe Leu Ala Leu Phe Phe Ile Ile Phe Asn Lys Gly Pro Gly Pro
385                 390                 395                 400

Gly His Val Leu Ser His Asn Ser Tyr Glu Lys Gly Pro Gly Pro Gly
                405                 410                 415

Lys Tyr Lys Ile Ala Gly Gly Ile Ala Gly Gly Leu Ala Leu Leu Ala
            420                 425                 430

Cys Ala Gly Leu Ala Tyr Lys Phe Val Val Pro Gly Ala Ala Thr Pro
        435                 440                 445

Tyr Ala Gly Glu Pro Ala Pro Phe
    450                 455
```

<210> 266
<211> 1385
<212> DNA
<213> Unknown

<220>
<223> PfCTL/HTL/(N)

<400> 266

atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccggatcc 60

agaggaagta gtgtgttcaa tgttgtgaac tcatcaattg gtctgatcat ggtgctgagc 120

tttctcgggc cagggccagg attatatatt tctttctact tcatccttgt caacctgtta 180

atattccaca ttaacggcaa aataataaag aacagtgaag gccctgggcc tgggcctgac 240

tcgatccagg attctctaaa agaatcgagg aagctctccg gaccaggccc tggtgtactc 300

gccgggttgc tgggagtagt tagcacagtg ctgttaggag gcgtcggcct cgtcttagga 360

cctggaccag gtctgccgtc cgaaaacgaa agaggatact acatacctca ccagagcagc 420

ctcggcccag gccccggaca aaccaatttc aaatccctct tgcgaaatct aggagtgagc 480

gagaacatat ttcttaaagg acccggtccc ggctttcagg acgaggagaa tataggtatt 540

tacggtccag gacctggaaa atacctagtg atcgtattcc taatttttt tgacctattt 600

ctggtgggcc caggtcccgg aaagttcatt aaatcactct tccacatttt tgacggagat 660

aacgagatag gacccggtcc cgggaaatca aagtacaaac tagccacttc agtgctggcc 720

ggccttctag ggccgggccc agggctcccc tatggaaaga caaatcttgg ccccggtcca 780

ggacggcaca actgggtgaa tcatgcggtt ccattggcca tgaaactaat cgggcccggt 840

ccaggcatgc gcaaacttgc aattctaagc gtaagttcat ttctgttcgt agaggcactg 900

tttcaagaat atggcccagg acctggcgtc acatgtggga atgggatcca ggtgagagga 960

ccgggacctg gtatgaacta ttacggtaaa caggaaaatt ggtactccct gaaaaagggt 1020

ccaggccccg gcccctcaga tggtaagtgc aacctgtatg ctgactcagc atgggagaac 1080

gtaaaaaatg taataggccc attcatgaag gcagtttgtg tcgaagtcgg accaggccca 1140

ggaaaaatac tttctgtctt cttcctagct ctcttcttca tcatcttcaa caagggacca 1200

gggccaggtc acgtgttatc ccataactct tatgaaaaag ggccaggacc tgggaaatac 1260

aaaatcgcag gagggatcgc cggcgggcta gcgctccttg cctgcgcagg cttggcttac 1320

aaattcgttg taccaggagc tgcaacaccc tatgcaggag aacctgcccc attttgaaga 1380

tctgc 1385

<210> 267
<211> 419
<212> PRT
<213> Unknown

<220>
<223> Pf33

<400> 267

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

```
Val Pro Gly Ser Arg Gly Phe Met Lys Ala Val Cys Val Glu Val Asn
            20                  25                  30

Val Thr Cys Gly Asn Gly Ile Gln Val Arg Lys Gly Leu Ile Met Val
        35                  40                  45

Leu Ser Phe Leu Asn Ala Ala Leu Phe His Ile Phe Asp Gly Asp Asn
    50                  55                  60

Glu Ile Lys Ala Ala Leu Leu Ala Cys Ala Gly Leu Ala Tyr Lys Lys
65                  70                  75                  80

Ser Phe Leu Phe Val Glu Ala Leu Phe Asn Ala Ala Pro Ser Asp Gly
                85                  90                  95

Lys Cys Asn Leu Tyr Lys Ala Ala Gln Thr Asn Phe Lys Ser Leu Leu
            100                 105                 110

Arg Asn Leu Pro Ser Glu Asn Glu Arg Gly Tyr Lys Ala Ala Gly Val
        115                 120                 125

Ser Glu Asn Ile Phe Leu Lys Asn Ala Ala Ala Tyr Phe Ile Leu Val
    130                 135                 140

Asn Leu Leu Ile Lys Ala Ala Ala Ile Leu Ser Val Ser Ser Phe Leu
145                 150                 155                 160

Phe Val Asn Thr Pro Tyr Ala Gly Glu Pro Ala Pro Phe Lys Ala Ala
                165                 170                 175

Ala Lys Tyr Lys Leu Ala Thr Ser Val Leu Lys Ala Ala Val Phe Leu
            180                 185                 190

Ile Phe Phe Asp Leu Phe Leu Asn Tyr Tyr Ile Pro His Gln Ser Ser
        195                 200                 205

Leu Lys Ala Ala Gly Leu Leu Gly Asn Val Ser Thr Val Gly Ala Val
    210                 215                 220

Leu Leu Gly Gly Val Gly Leu Val Leu Asn Leu Ala Cys Ala Gly Leu
225                 230                 235                 240

Ala Tyr Lys Lys Ala Lys Phe Ile Lys Ser Leu Phe His Ile Phe Lys
                245                 250                 255

Ala Ala Phe Tyr Phe Ile Leu Val Asn Leu Leu Lys Ala Phe Leu Ile
            260                 265                 270
```

```
Phe Phe Asp Leu Phe Leu Val Lys Ala Leu Phe Phe Ile Ile Phe Asn
        275                 280                 285

Lys Asn Tyr Tyr Gly Lys Gln Glu Asn Trp Tyr Ser Leu Lys Phe Val
    290                 295                 300

Glu Ala Leu Phe Gln Glu Tyr Asn Ala Ala Ala Lys Phe Val Ala Ala
305                 310                 315                 320

Trp Thr Leu Lys Ala Ala Ala Lys Ile Leu Ser Val Phe Phe Leu Ala
                325                 330                 335

Asn Ala Val Leu Ala Gly Leu Leu Gly Asn Val Asn Phe Gln Asp Glu
            340                 345                 350

Glu Asn Ile Gly Ile Tyr Lys Ala Ala Ala Leu Tyr Ile Ser Phe Tyr
        355                 360                 365

Phe Ile Lys Ala Phe Ile Leu Val Asn Leu Leu Ile Phe His Asn Ala
    370                 375                 380

Ala Leu Pro Tyr Gly Arg Thr Asn Leu Lys Ala Ala His Val Leu Ser
385                 390                 395                 400

His Asn Ser Tyr Glu Lys Asn Ala Ala Ala Lys Tyr Leu Val Ile Val
                405                 410                 415

Phe Leu Ile
```

<210> 268
<211> 1269
<212> DNA
<213> Unknown

<220>
<223> Pf33

<400> 268

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gccgccacca tgggaatgca ggtgcagatc cagagcctgt ttctgctcct cctgtgggtg     60

cccggatcca gaggatttat gaaagctgtc tgtgtagagg tgaatgtaac atgcggtaac    120

ggaattcagg tgagaaaggg actcatcatg gtactcagct ttctgaacgc agccctgttc    180

cacatctttg acggagacaa tgaaatcaaa gccgcattgc tcgcctgtgc cggactagcc    240

tataaaaaga gtttcctttt cgttgaagca ctatttaacg cagcacccag tgacggtaaa    300

tgcaacctat ataaagcagc tcagactaat ttcaaaagcc tgttaagaaa tctgccctca    360
```

gagaatgaaa ggggttacaa agccgccggc gtgtccgaga atattttcct gaagaacgcc 420

gctgcttatt ttatactcgt gaatctactc ataaaggcag ccgcaatcct ttcagtgtcc 480

agctttctgt ttgttaacac accatatgcg ggcgagccgg ctcctttcaa ggctgcagca 540

aaatacaagc ttgccacatc agtattgaaa gcagctgtgt ttttgatatt ctttgatctt 600

tttttaaact actacatacc tcatcagtct agtcttaaag cagccgggct actggggaac 660

gtctctactg tgggggccgt cttacttgga ggagttggcc tcgtgttgaa cctcgcgtgc 720

gcaggtctgg cctacaaaaa agcgaaattc atcaagtctc tgttccacat ttttaaagcc 780

gcattctatt tcatactagt gaaccttctc aaagctttcc tgatcttctt cgatctattc 840

ctcgtaaaag cgctattctt cattatcttt aacaaaaatt attacggcaa gcaagaaaat 900

tggtactcac tcaagtttgt agaagctctg ttccaggaat acaacgccgc tgctaaattc 960

gttgcagctt ggaccctgaa agcagctgca aagatcctat cggtcttctt tctcgctaat 1020

gccgtattag caggacttct aggcaacgtg aactttcaag acgaagagaa tataggcatc 1080

tacaaagccg cagcactgta catttcattc tacttcatca aggccttcat actggtcaac 1140

cttctgatat ttcataatgc agcactgcca tatgggagaa ccaacttgaa agcggcccac 1200

gtgttgagcc acaactccta cgagaagaac gccgccgcga aatatctcgt cattgtcttc 1260

ctgatttga 1269

<210> 269
<211> 180
<212> PRT
<213> Unknown

<220>
<223> TB.1

<400> 269

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Arg Met Ser Arg Val Thr Thr Phe Thr Val Lys Ala
20 25 30

Leu Val Leu Leu Met Leu Pro Val Val Asn Leu Met Ile Gly Thr Ala
35 40 45

Ala Ala Val Val Lys Ala Leu Val Leu Leu Met Leu Pro Val Gly Ala
50 55 60

Gly Leu Met Thr Ala Val Tyr Leu Val Gly Ala Ala Ala Met Ala Leu
65 70 75 80

```
Leu Arg Leu Pro Val Lys Arg Met Phe Ala Ala Asn Leu Gly Val Asn
                85                  90                  95

Ser Leu Tyr Phe Gly Gly Ile Cys Val Gly Arg Leu Pro Leu Val Leu
            100                 105                 110

Pro Ala Val Asn Ala Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu
        115                 120                 125

Lys Ala Ala Ala Lys Ala Ala Ala Arg Leu Met Ile Gly Thr Ala Ala
    130                 135                 140

Ala Gly Phe Val Val Ala Leu Ile Pro Leu Val Asn Ala Met Thr Tyr
145                 150                 155                 160

Ala Ala Pro Leu Phe Val Gly Ala Ala Ala Ala Met Ala Leu Leu Arg
                165                 170                 175

Leu Pro Leu Val
            180
```

<210> 270
<211> 543
<212> DNA
<213> Unknown

<220>
<223> TB.1

<400> 270

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atgcaggtgc agatccagag cctgtttctg ctcctcctgt gggtgcccgg atccagagga     60

aggatgagca gagtgaccac attcactgtc aaggccctgg tgctcctgat gctccccgtc    120

gtgaacctga tgatcggcac cgctgcagcc gtcgtgaaag ctctcgtcct gctcatgctc    180

cctgtgggag cagggctgat gacagccgtg tacctggtcg gcgctgcagc catggccctc    240

ctgcggctgc cagtgaagcg catgtttgct gcaaatctgg gagtcaactc cctctatttc    300

gggggcattt gcgtgggaag gctgcccctc gtgctgcctg ctgtgaatgc agccgctgcc    360

aaatttgtcg ccgcttggac tctgaaggca gccgctaagg ccgctgcaag actgatgatc    420

gggaccgccg ctgccggctt cgtggtcgcc ctgattcccc tggtgaacgc catgacatac    480

gcagctcctc tgtttgtggg agccgctgca gccatggctc tcctgcggct gccactggtg    540

tga                                                                  543
```

<210> 271
<211> 148
<212> PRT
<213> Unknown

<220>
<223> BCL A2 #90

<400> 271

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Ile Met Ile Gly His Leu Val Gly Val Asn Arg Leu
20 25 30

Leu Gln Glu Thr Glu Leu Val Asn Ala Lys Val Ala Glu Ile Val His
35 40 45

Phe Leu Asn Ala Lys Val Phe Gly Ser Leu Ala Phe Val Asn Ala Tyr
50 55 60

Leu Ser Gly Ala Asn Leu Asn Val Gly Ala Ala Tyr Leu Gln Leu Val
65 70 75 80

Phe Gly Ile Glu Val Asn Ala Ala Ala Lys Phe Val Ala Ala Trp Thr
85 90 95

Leu Lys Ala Ala Ala Lys Ala Ala Ala Val Val Leu Gly Val Val Phe
100 105 110

Gly Ile Asn Ser Met Pro Pro Pro Gly Thr Arg Val Asn Ala Ala Ala
115 120 125

Ala Thr Val Gly Ile Met Ile Gly Val Asn Ala Lys Leu Cys Pro Val
130 135 140

Gln Leu Trp Val
145

<210> 272
<211> 447
<212> DNA
<213> Unknown

<220>
<223> BCL A2 #90

<400> 272
atgcaggtgc agatccagag cctgtttctg ctcctcctgt gggtgcccgg gtccagagga 60

attatgatcg gccatctggt gggcgtcaac agactgctgc aggaaaccga gctggtgaat 120

gccaaggtgg ccgaaattgt gcactttctc aacgcaaagg tgtttggttc cctggctttt 180

gtcaatgcct atctgagcgg cgctaacctc aacgtcggag ccgcctacct ccagctggtc 240

ttcggcatcg aggtcaacgc tgctgcaaaa ttcgtggcag cttggaccct caaggctgca 300

gcaaaggctg ccgccgtcgt gctcggagtg gtgttcggga tcaactctat gccacctccc 360

gggactaggg tcaatgctgc cgccgcaaca gtgggaatca tgattggggt gaatgccaaa 420

ctgtgcccag tgcaactgtg ggtgtga 447

<210> 273
<211> 144
<212> PRT
<213> Unknown

<220>
<223> BCL A2 #88

<400> 273

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Val Val Leu Gly Val Val Phe Gly Ile Asn Ala Ala
20 25 30

Ala Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys Val
35 40 45

Ala Glu Ile Val His Phe Leu Asn Ala Tyr Leu Ser Gly Ala Asn Leu
50 55 60

Asn Val Gly Ala Ala Tyr Leu Gln Leu Val Phe Gly Ile Glu Val Asn
65 70 75 80

Ile Met Ile Gly His Leu Val Gly Val Asn Arg Leu Leu Gln Glu Thr
85 90 95

Glu Leu Val Asn Ala Lys Val Phe Gly Ser Leu Ala Phe Val Asn Ala
100 105 110

Lys Leu Cys Pro Val Gln Leu Trp Val Asn Ala Ala Ala Ala Thr Val
115 120 125

Gly Ile Met Ile Gly Val Asn Ser Met Pro Pro Pro Gly Thr Arg Val
130 135 140

<210> 274
<211> 435
<212> DNA
<213> Unknown

<220>
<223> BCL A2 #88

<400> 274
atgcaggtgc agatccagag cctgtttctg ctcctcctgt gggtgcccgg gtccagagga 60

gtcgtgctgg gagtcgtctt cggcattaat gccgccgctg caaagttcgt ggctgcctgg 120

accctgaagg ccgcagctaa agtggcagag atcgtgcact ttctgaacgc ctacctgagc 180

ggagcaaatc tgaacgtcgg cgctgcctat ctgcagctcg tgtttggaat tgaagtgaac 240

atcatgattg gacatctggt gggcgtgaac aggctgctcc aggaaactga gctggtcaac 300

gctaaagtgt tcgggtctct cgcctttgtg aacgctaagc tctgccccgt ccaactctgg 360

gtcaatgccg cagccgctac agtggggatc atgatcggcg tgaactccat gcctccacca 420

gggaccagag tgtga 435

<210> 275
<211> 147
<212> PRT
<213> Unknown

<220>
<223> BCL A2 #63

<400> 275

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Lys Leu Cys Pro Val Gln Leu Trp Val Asn Ala Ala
20 25 30

Ala Ala Thr Val Gly Ile Met Ile Gly Val Asn Ile Met Ile Gly His
35 40 45

Leu Val Gly Val Asn Arg Leu Leu Gln Glu Thr Glu Leu Val Asn Ala
50 55 60

Lys Val Ala Glu Ile Val His Phe Leu Asn Ala Lys Val Phe Gly Ser
65 70 75 80

Leu Ala Phe Val Asn Ala Tyr Leu Ser Gly Ala Asn Leu Asn Val Gly
85 90 95

Ala Ala Tyr Leu Gln Leu Val Phe Gly Ile Glu Val Asn Ala Ala Ala
100 105 110

Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys Ala Ala Ala
115 120 125

Val Val Leu Gly Val Val Phe Gly Ile Asn Ser Met Pro Pro Pro Gly
130 135 140

Thr Arg Val
145

<210> 276
<211> 450
<212> DNA
<213> Unknown

<220>
<223> BCL A2 #63

<400> 276
atgcaggtgc agatccagag cctgtttctg ctcctcctgt gggtgcccgg gtccagagga 60

aagctctgcc ccgtgcaact gtgggtcaac gccgccgccg caaccgtcgg cattatgatc 120

ggggtgaaca tcatgatcgg acacctggtc ggcgtgaaca ggctgctgca ggagacagaa 180

ctggtcaatg ccaaggtggc tgaaattgtc catttcctga atgccaaagt gttcggctct 240

ctcgctttcg tgaacgctta tctgagcgga gctaacctca acgtgggggc cgcatacctc 300

cagctcgtct ttgggattga ggtgaatgcc gcagctaaat ttgtcgctgc ctggaccctg 360

aaggcagcag ccaaggctgc cgcagtggtg ctgggagtgg tgtttggaat caattccatg 420

cctccaccag gcactagagt gtgaggatcc 450

<210> 277
<211> 183
<212> PRT
<213> Unknown

<220>
<223> Prostate 1

<400> 277

Leu Thr Phe Phe Trp Leu Asp Arg Ser Val Lys Ala Ala Ala Val Leu
1 5 10 15

Val His Pro Gln Trp Val Leu Thr Val Lys Ala Ala Ala Leu Leu Gln
20 25 30

Glu Arg Gly Val Ala Tyr Ile Lys Ala Ala Leu Leu Leu Ser Ile Ala
35 40 45

Leu Ser Val Asn Pro Leu Val Cys Asn Gly Val Leu Gln Gly Val Lys
50 55 60

Ala Ala Ile Met Tyr Ser Ala His Asp Thr Thr Val Lys Ala Ala Ala
65 70 75 80

Phe Leu Thr Pro Lys Lys Leu Gln Cys Val Asn Ala Met Met Asn Asp

85 90 95

Gln Leu Met Phe Leu Asn Ala Gly Leu Pro Ser Ile Pro Val His Pro
100 105 110

Val Lys Ala Ala Ala Leu Gly Thr Thr Cys Tyr Val Gly Ala Ala Ile
115 120 125

Leu Leu Trp Gln Pro Ile Pro Val Asn Phe Leu Arg Pro Arg Ser Leu
130 135 140

Gln Cys Val Lys Ala Phe Leu Thr Leu Ser Val Thr Trp Ile Gly Val
145 150 155 160

Asn Ala Leu Leu Tyr Ser Leu Val His Asn Leu Gly Ala Ala Thr Leu
165 170 175

Met Ser Ala Met Thr Asn Leu
180

<210> 278
<211> 648
<212> DNA
<213> Unknown

<220>
<223> Prostate 1

<400> 278
atgcaggtgc agatccagag cctgtttctg ctcctcctgt gggtgcccgg gtccagagga 60

ttgacatttt tttggctgga tagatcggtt aaggctgcag ccgtgcttgt tcatccccag 120

tgggtcttga ccgtaaaggc tgccgcgctg ctacaagaaa gaggggtcgc atacatcaaa 180

gctgctctcc tcttgagtat tgcgctaagt gtaaacccgc tagtttgtaa tggggtgtta 240

caaggtgtga aagcggcgat tatgtacagt gcccacgaca ctaccgtaaa agcagccgct 300

ttcctgaccc caaaaaaact ccaatgcgtg aacgcaatga tgaatgatca gctgatgttt 360

ttaaacgctg gcttaccttc tataccggtt catccagtca aggccgcggc attgggtacg 420

acgtgttatg ttggagcagc gatacttctt tggcagccca taccagtaaa ttttttaaga 480

cctagatcct tacaatgcgt caaagcattc cttacactct cagtaacttg gatcggagtc 540

aatgctctgc tatatagcct cgtacacaac ttgggcgcgg ccacacttat gagtgcaatg 600

acgaatttag ctaagttcgt ggcggcctgg actctaaagg ccgcagca 648

<210> 279
<211> 322
<212> PRT

<213> Human immunodeficiency virus

<400> 279

```
Met Glu Lys Val Tyr Leu Ala Trp Val Pro Ala His Lys Gly Ile Gly
1               5                  10                  15

Gly Gly Pro Gly Pro Gly Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe
            20                  25                  30

Arg Val Tyr Tyr Arg Gly Pro Gly Pro Gly Trp Glu Phe Val Asn Thr
        35                  40                  45

Pro Pro Leu Val Lys Leu Trp Tyr Gln Gly Pro Gly Pro Gly Tyr Arg
    50                  55                  60

Lys Ile Leu Arg Gln Arg Lys Ile Asp Arg Leu Ile Asp Gly Pro Gly
65                  70                  75                  80

Pro Gly Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
                85                  90                  95

Gln Gly Pro Gly Pro Gly Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu
            100                 105                 110

Gly Leu Asn Lys Ile Val Arg Met Tyr Gly Pro Gly Pro Gly Gln Gly
        115                 120                 125

Gln Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn Gly Pro Gly
    130                 135                 140

Pro Gly Ile Lys Gln Phe Ile Asn Met Trp Gln Glu Val Gly Lys Ala
145                 150                 155                 160

Met Tyr Gly Pro Gly Pro Gly Trp Ala Gly Ile Lys Gln Glu Phe Gly
                165                 170                 175

Ile Pro Tyr Asn Pro Gln Gly Pro Gly Pro Gly Lys Thr Ala Val Gln
            180                 185                 190

Met Ala Val Phe Ile His Asn Phe Lys Arg Gly Pro Gly Pro Gly Ser
        195                 200                 205

Pro Ala Ile Phe Gln Ser Ser Met Thr Lys Ile Leu Glu Pro Gly Pro
    210                 215                 220

Gly Pro Gly Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala Leu Gly
225                 230                 235                 240
```

```
Ile Ile Gly Pro Gly Pro Gly His Ser Asn Trp Arg Ala Met Ala Ser
                245                 250                 255

Asp Phe Asn Leu Pro Pro Gly Pro Gly Pro Gly Ala Glu Thr Phe Tyr
            260                 265                 270

Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Gly Pro Gly Pro Gly Gly
        275                 280                 285

Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Gly Pro
    290                 295                 300

Gly Pro Gly Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn
305                 310                 315                 320

Asn Glu
```

<210> 280
<211> 969
<212> DNA
<213> Human immunodeficiency virus

<400> 280

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atggagaagg tgtacctggc ctgggttcca gcccacaaag gcatcggggg agggcccgga     60

cctgggcaga aacagatcac caagatccag aacttccggg tatactaccg gggacctggt    120

ccaggttggg agtttgtgaa cacaccaccc ttagtaaagc tctggtacca gggccccggt    180

cccggatacc gtaaaatcct gaggcaaaga aagatagatc gcctcattga tggcccgggc    240

ccaggccagc accttctgca gcttacagtg tggggaatta aacagctgca ggggccgggc    300

cccgggggggg aaatttataa aaggtggatc attctgggtc tgaacaagat cgtccgcatg    360

tatggccctg gacccggaca ggggcagatg gtccaccaag caatcagccc tcgaaccttg    420

aatggaccgg gcccaggaat caagcaattc attaacatgt ggcaagaagt tggtaaggct    480

atgtacggtc ccggccctgg atgggcaggg ataaaacagg agtttggaat cccttacaat    540

ccccagggtc ctgggccagg taaaacggca gtgcagatgg ccgtgttcat tcataatttt    600

aagcggggcc ctggacctgg cagcccagct atatttcaaa gttcgatgac caaaatcttg    660

gagcccggcc cagggccggg cgaagtgaac attgtcacag attctcagta tgccctcggc    720

atcatagggc ccggaccagg gcattccaat tggcgcgcca tggcgtctga ctttaatcta    780

cctcctgggc caggccctgg cgcggaaact ttctatgtgg acggcgctgc aaacagggag    840

actaagggac ccggacccgg cggcgctgta gtcattcagg acaactcaga catcaaggtg    900

gttcccggtc caggccccgg gttcagaaag tataccgcct tcactattcc gtccatcaac    960
```

969

aatgagtga

<210> 281
<211> 340
<212> PRT
<213> Human immunodeficiency virus

<400> 281

Met Glu Lys Val Tyr Leu Ala Trp Val Pro Ala His Lys Gly Ile Gly
1 5 10 15

Gly Gly Pro Gly Pro Gly Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe
20 25 30

Arg Val Tyr Tyr Arg Gly Pro Gly Pro Gly Trp Glu Phe Val Asn Thr
35 40 45

Pro Pro Leu Val Lys Leu Trp Tyr Gln Gly Pro Gly Pro Gly Tyr Arg
50 55 60

Lys Ile Leu Arg Gln Arg Lys Ile Asp Arg Leu Ile Asp Gly Pro Gly
65 70 75 80

Pro Gly Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
85 90 95

Gln Gly Pro Gly Pro Gly Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu
100 105 110

Gly Leu Asn Lys Ile Val Arg Met Tyr Gly Pro Gly Pro Gly Gln Gly
115 120 125

Gln Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn Gly Pro Gly
130 135 140

Pro Gly Ile Lys Gln Phe Ile Asn Met Trp Gln Glu Val Gly Lys Ala
145 150 155 160

Met Tyr Gly Pro Gly Pro Gly Trp Ala Gly Ile Lys Gln Glu Phe Gly
165 170 175

Ile Pro Tyr Asn Pro Gln Gly Pro Gly Pro Gly Lys Thr Ala Val Gln
180 185 190

Met Ala Val Phe Ile His Asn Phe Lys Arg Gly Pro Gly Pro Gly Ser
195 200 205

```
Pro Ala Ile Phe Gln Ser Ser Met Thr Lys Ile Leu Glu Pro Gly Pro
    210                 215                 220

Gly Pro Gly Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala Leu Gly
225                 230                 235                 240

Ile Ile Gly Pro Gly Pro Gly His Ser Asn Trp Arg Ala Met Ala Ser
                245                 250                 255

Asp Phe Asn Leu Pro Pro Gly Pro Gly Pro Gly Ala Glu Thr Phe Tyr
            260                 265                 270

Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Gly Pro Gly Pro Gly Gly
        275                 280                 285

Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Gly Pro
    290                 295                 300

Gly Pro Gly Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn
305                 310                 315                 320

Asn Glu Gly Pro Gly Pro Gly Ala Lys Phe Val Ala Ala Trp Thr Leu
                325                 330                 335

Lys Ala Ala Ala
            340
```

<210> 282
<211> 1023
<212> DNA
<213> Human immunodeficiency virus

<400> 282

```
atggagaagg tgtacctggc ctgggttcca gcccacaaag gcatcggggg agggcccgga     60

cctgggcaga aacagatcac caagatccag aacttccggg tatactaccg gggacctggt    120

ccaggttggg agtttgtgaa cacaccaccc ttagtaaagc tctggtacca gggccccggt    180

cccggatacc gtaaaatcct gaggcaaaga aagatagatc gcctcattga tggcccgggc    240

ccaggccagc accttctgca gcttacagtg tggggaatta aacagctgca ggggccgggc    300

cccgggggggg aaatttataa aaggtggatc attctgggtc tgaacaagat cgtccgcatg    360

tatggccctg gacccggaca ggggcagatg gtccaccaag caatcagccc tcgaaccttg    420

aatggaccgg gcccaggaat caagcaattc attaacatgt ggcaagaagt tggtaaggct    480

atgtacggtc ccggccctgg atgggcaggg ataaaacagg agtttggaat cccttacaat    540

ccccagggtc ctgggccagg taaaacggca gtgcagatgg ccgtgttcat tcataatttt    600
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aagcggggcc ctggacctgg cagcccagct atatttcaaa gttcgatgac caaaatcttg 660

gagcccggcc cagggccggg cgaagtgaac attgtcacag attctcagta tgccctcggc 720

atcatagggc ccggaccagg gcattccaat tggcgcgcca tggcgtctga ctttaatcta 780

cctcctgggc caggccctgg cgcggaaact ttctatgtgg acggcgctgc aaacagggag 840

actaagggac ccggacccgg cggcgctgta gtcattcagg acaactcaga catcaaggtg 900

gttcccggtc caggccccgg gttcagaaag tataccgcct tcactattcc gtccatcaac 960

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<400> 283

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Pro Gly Pro Gly Gln Gly Gln Met Val His Gln Ala Ile Ser Pro Arg
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Thr Leu Asn Gly Pro Gly Pro Gly Ser Pro Ala Ile Phe Gln Ser Ser
35 40 45

Met Thr Lys Ile Leu Glu Pro Gly Pro Gly Pro Gly Phe Arg Lys Tyr
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Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn Glu
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agccctgcca tcttccagag cagcatgacc aagatcctgg agcccggacc tggacctgga 180

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<223> PfHTL

<400> 285

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            20                  25                  30

Met Lys Leu Ile Gly Pro Gly Pro Gly Lys Cys Asn Leu Tyr Ala Asp
        35                  40                  45

Ser Ala Trp Glu Asn Val Lys Asn Gly Pro Gly Pro Gly Lys Ser Lys
    50                  55                  60

Tyr Lys Leu Ala Thr Ser Val Leu Ala Gly Leu Leu Gly Pro Gly Pro
65                  70                  75                  80

Gly Gln Thr Asn Phe Lys Ser Leu Leu Arg Asn Leu Gly Val Ser Glu
                85                  90                  95

Gly Pro Gly Pro Gly Ser Ser Val Phe Asn Val Val Asn Ser Ser Ile
            100                 105                 110

Gly Leu Ile Met Gly Pro Gly Pro Gly Val Lys Asn Val Ile Gly Pro
        115                 120                 125

Phe Met Lys Ala Val Cys Val Glu Gly Pro Gly Pro Gly Met Asn Tyr
    130                 135                 140

Tyr Gly Lys Gln Glu Asn Trp Tyr Ser Leu Lys Lys Gly Pro Gly Pro
145                 150                 155                 160

Gly Gly Leu Ala Tyr Lys Phe Val Val Pro Gly Ala Ala Thr Pro Tyr
                165                 170                 175

Gly Pro Gly Pro Gly Pro Asp Ser Ile Gln Asp Ser Leu Lys Glu Ser
            180                 185                 190

Arg Lys Leu Asn Gly Pro Gly Pro Gly Leu Leu Ile Phe His Ile Asn
        195                 200                 205

Gly Lys Ile Ile Lys Asn Ser Glu Gly Pro Gly Pro Gly Ala Gly Leu
    210                 215                 220
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Leu Gly Asn Val Ser Thr Val Leu Leu Gly Gly Val Gly Pro Gly Pro
225 230 235 240

Gly Lys Tyr Lys Ile Ala Gly Gly Ile Ala Gly Gly Leu Ala Leu Leu
245 250 255

Gly Pro Gly Pro Gly Met Arg Lys Leu Ala Ile Leu Ser Val Ser Ser
260 265 270

Phe Leu Phe Val
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ggaccaggga aatgcaacct ctacgcagac agcgcctggg agaacgtcaa gaatggcccc 180

ggacctggga aatccaagta taagctcgct acctctgtgc tggcaggcct gctcggacca 240

ggccccggac agacaaattt caaaagcctg ctcagaaacc tgggagtgtc cgaggggcct 300

ggcccaggat ctagcgtctt taatgtggtc aactcctcta ttgggctcat catgggaccc 360

ggacctgggg tgaaaaatgt cattggccca ttcatgaagg ccgtgtgtgt cgaaggaccc 420

gggcctggca tgaactacta tggaaagcaa gaaaattggt acagcctgaa gaaaggccct 480

gggccaggcg gactggctta caagtttgtg gtcccagggg cagccactcc ctatgggcct 540

gggccaggcc ccgattccat ccaggactct ctcaaagaga gccggaaact gaacggaccc 600

gggcctggac tgctcatttt ccacatcaat ggcaaaatta tcaagaacag cgagggacct 660

gggccaggcg ccggactgct ggggaacgtg tccaccgtcc tgctcggcgg agtggggccc 720

ggccctggga agtacaagat cgctggaggg atcgcaggcg gactggccct cctgggccca 780

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Met Thr Asn Asn Pro Pro Ile Pro Val
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Met Ala Ser Asp Phe Asn Leu Pro Pro Val
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Lys Leu Val Gly Lys Leu Asn Trp Ala
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Ile Leu Lys Glu Pro Val His Gly Val
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Arg Ala Met Ala Ser Asp Phe Asn Leu
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Arg Ile Leu Gln Gln Leu Leu Phe Ile
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Ala Ile Phe Gln Ser Ser Met Thr Lys
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Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys
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Phe Pro Ile Ser Pro Ile Glu Thr Val
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Ile Pro Ile His Tyr Cys Ala Pro Ala
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Cys Pro Lys Val Ser Phe Glu Pro Ile
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Glu Val Asn Ile Val Thr Asp Ser Gln Tyr

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Phe Arg Asp Tyr Val Asp Arg Phe Tyr
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Pro Tyr Asn Thr Pro Val Phe Ala Ile
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Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile

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Asp Leu Met Gly Tyr Ile Pro Leu Val
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Trp Met Asn Arg Leu Ile Ala Phe Ala
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Val Leu Val Gly Gly Val Leu Ala Ala
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Gly Val Ala Gly Ala Leu Val Ala Phe Lys
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Val Ala Gly Ala Leu Val Ala Phe Lys
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Leu Ala Asp Gly Gly Cys Ser Gly Gly Ala Tyr
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Phe Trp Ala Lys His Met Trp Asn Phe
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Arg Met Ile Leu Met Thr His Phe Phe
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Val Met Gly Ser Ser Tyr Gly Phe
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Gly Leu Leu Gly Val Val Ser Thr Val
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Gly Val Ser Glu Asn Ile Phe Leu Lys
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Ala Leu Phe Phe Ile Ile Phe Asn Lys
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<211> 9
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<213> Plasmodium falciparum

<400> 402

Phe Tyr Phe Ile Leu Val Asn Leu Leu
1 5

<210> 403
<211> 9
<212> PRT
<213> Plasmodium falciparum

<400> 403

Lys Tyr Leu Val Ile Val Phe Leu Ile
1 5

<210> 404
<211> 9
<212> PRT
<213> Plasmodium falciparum

<400> 404

Gly Leu Ile Met Val Leu Ser Phe Leu
1 5

<210> 405
<211> 9
<212> PRT
<213> Plasmodium falciparum

<400> 405

Lys Ile Leu Ser Val Phe Phe Leu Ala
1 5

<210> 406
<211> 10
<212> PRT
<213> Plasmodium falciparum

<400> 406

Val Thr Cys Gly Asn Gly Ile Gln Val Arg

1 5 10

<210> 407
<211> 10
<212> PRT
<213> Plasmodium falciparum

<400> 407

His Val Leu Ser His Asn Ser Tyr Glu Lys
1 5 10

<210> 408
<211> 9
<212> PRT
<213> Plasmodium falciparum

<400> 408

Pro Ser Asp Gly Lys Cys Asn Leu Tyr
1 5

<210> 409
<211> 9
<212> PRT
<213> Plasmodium falciparum

<400> 409

Tyr Tyr Ile Pro His Gln Ser Ser Leu
1 5

<210> 410
<211> 10
<212> PRT
<213> Plasmodium falciparum

<400> 410

Lys Phe Ile Lys Ser Leu Phe His Ile Phe
1 5 10

<210> 411
<211> 10
<212> PRT
<213> Plasmodium falciparum

<400> 411

Val Phe Leu Ile Phe Phe Asp Leu Phe Leu
1 5 10

<210> 412
<211> 11
<212> PRT
<213> Plasmodium falciparum

<400> 412

Leu Phe His Ile Phe Asp Gly Asp Asn Glu Ile
1 5 10

<210> 413
<211> 11
<212> PRT
<213> Plasmodium falciparum

<400> 413

Tyr Tyr Gly Lys Gln Glu Asn Trp Tyr Ser Leu
1 5 10

<210> 414
<211> 8
<212> PRT
<213> Plasmodium falciparum

<400> 414

Leu Tyr Ile Ser Phe Tyr Phe Ile
1 5

<210> 415
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 415

Met Arg Lys Leu Ala Ile Leu Ser Val Ser Ser Phe Leu Phe Val
1 5 10 15

<210> 416
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 416

Met Asn Tyr Tyr Gly Lys Gln Glu Asn Trp Tyr Ser Leu Lys Lys
1 5 10 15

<210> 417
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 417

Ser Ser Val Phe Asn Val Val Asn Ser Ser Ile Gly Leu Ile Met
1 5 10 15

<210> 418

<211> 16
<212> PRT
<213> Plasmodium falciparum

<400> 418

Arg His Asn Trp Val Asn His Ala Val Pro Leu Ala Met Lys Leu Ile
1 5 10 15

<210> 419
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 419

Pro Asp Ser Ile Gln Asp Ser Leu Lys Glu Ser Arg Lys Leu Asn
1 5 10 15

<210> 420
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 420

Lys Cys Asn Leu Tyr Ala Asp Ser Ala Trp Glu Asn Val Lys Asn
1 5 10 15

<210> 421
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 421

Val Lys Asn Val Ile Gly Pro Phe Met Lys Ala Val Cys Val Glu
1 5 10 15

<210> 422
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 422

Lys Tyr Lys Ile Ala Gly Gly Ile Ala Gly Gly Leu Ala Leu Leu
1 5 10 15

<210> 423
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 423

Gly Leu Ala Tyr Lys Phe Val Val Pro Gly Ala Ala Thr Pro Tyr

1 5 10 15

<210> 424
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 424

Lys Ser Lys Tyr Lys Leu Ala Thr Ser Val Leu Ala Gly Leu Leu
1 5 10 15

<210> 425
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 425

Ala Gly Leu Leu Gly Asn Val Ser Thr Val Leu Leu Gly Gly Val
1 5 10 15

<210> 426
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 426

Leu Leu Ile Phe His Ile Asn Gly Lys Ile Ile Lys Asn Ser Glu
1 5 10 15

<210> 427
<211> 15
<212> PRT
<213> Plasmodium falciparum

<400> 427

Gln Thr Asn Phe Lys Ser Leu Leu Arg Asn Leu Gly Val Ser Glu
1 5 10 15

<210> 428
<211> 10
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 428

Arg Met Ser Arg Val Thr Thr Phe Thr Val
1 5 10

<210> 429

<211> 10
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 429

Ala Leu Val Leu Leu Met Leu Pro Val Val
1 5 10

<210> 430
<211> 10
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 430

Leu Met Ile Gly Thr Ala Ala Ala Val Val
1 5 10

<210> 431
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 431

Ala Leu Val Leu Leu Met Leu Pro Val
1 5

<210> 432
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 432

Gly Leu Met Thr Ala Val Tyr Leu Val
1 5

<210> 433
<211> 8
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 433

Met Ala Leu Leu Arg Leu Pro Val
1 5

<210> 434
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 434

Arg Met Phe Ala Ala Asn Leu Gly Val
1 5

<210> 435
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 435

Ser Leu Tyr Phe Gly Gly Ile Cys Val
1 5

<210> 436
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 436

Arg Leu Pro Leu Val Leu Pro Ala Val
1 5

<210> 437
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 437

Arg Leu Met Ile Gly Thr Ala Ala Ala
1 5

<210> 438
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 438

Phe Val Val Ala Leu Ile Pro Leu Val
1 5

<210> 439
<211> 9
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 439

Met Thr Tyr Ala Ala Pro Leu Phe Val
1 5

<210> 440
<211> 10
<212> PRT
<213> Unknown

<220>
<223> TB

<400> 440

Ala Met Ala Leu Leu Arg Leu Pro Leu Val
1 5 10

<210> 441
<211> 9
<212> PRT
<213> Unknown

<220>
<223> p53 139

<400> 441

Lys Leu Cys Pro Val Gln Leu Trp Val
1 5

<210> 442
<211> 9
<212> PRT
<213> Unknown

<220>

<223> CEA 687

<400> 442

Ala Thr Val Gly Ile Met Ile Gly Val
1 5

<210> 443
<211> 9
<212> PRT
<213> Unknown

<220>
<223> CEA 691

<400> 443

Ile Met Ile Gly His Leu Val Gly Val
1 5

<210> 444
<211> 9
<212> PRT
<213> Unknown

<220>
<223> Her2/neu 689

<400> 444

Arg Leu Leu Gln Glu Thr Glu Leu Val
1 5

<210> 445
<211> 9
<212> PRT
<213> Unknown

<220>
<223> MAGE3 112

<400> 445

Lys Val Ala Glu Ile Val His Phe Leu
1 5

<210> 446
<211> 9
<212> PRT
<213> Unknown

<220>
<223> Her2/neu 665

<400> 446

Val Val Leu Gly Val Val Phe Gly Ile
1 5

<210> 447
<211> 9
<212> PRT
<213> Unknown

<220>
<223> p53 149

<400> 447

Ser Met Pro Pro Pro Gly Thr Arg Val
1 5

<210> 448
<211> 10
<212> PRT
<213> Unknown

<220>
<223> PAP.21.T2

<400> 448

Leu Thr Phe Phe Trp Leu Asp Arg Ser Val
1 5 10

<210> 449
<211> 9
<212> PRT
<213> Unknown

<220>
<223> PAP.112

<400> 449

Thr Leu Met Ser Ala Met Thr Asn Leu
1 5

<210> 450
<211> 10
<212> PRT
<213> Unknown

<220>
<223> PAP.284

<400> 450

Ile Met Tyr Ser Ala His Asp Thr Thr Val
1 5 10

<210> 451
<211> 10
<212> PRT
<213> Unknown

<220>
<223> PSM.288.V10

<400> 451

Gly Leu Pro Ser Ile Pro Val His Pro Val
1 5 10

<210> 452
<211> 10
<212> PRT
<213> Unknown

<220>
<223> PSM.441

<400> 452

Leu Leu Gln Glu Arg Gly Val Ala Tyr Ile
1 5 10

<210> 453
<211> 9
<212> PRT
<213> Unknown

<220>
<223> PSM.469L2

<400> 453

Leu Leu Tyr Ser Leu Val His Asn Leu
1 5

<210> 454
<211> 9
<212> PRT
<213> Unknown

<220>
<223> PSM.663

<400> 454

Met Met Asn Asp Gln Leu Met Phe Leu
1 5

<210> 455
<211> 11
<212> PRT
<213> Unknown

<220>
<223> PSA.3.V11

<400> 455

Phe Leu Thr Leu Ser Val Thr Trp Ile Gly Val

1 5 10

<210> 456
<211> 8
<212> PRT
<213> Unknown

<220>
<223> PSA.143.V8

<400> 456

Ala Leu Gly Thr Thr Cys Tyr Val
1 5

<210> 457
<211> 10
<212> PRT
<213> Unknown

<220>
<223> PSA.161

<400> 457

Phe Leu Thr Pro Lys Lys Leu Gln Cys Val
1 5 10

<210> 458
<211> 9
<212> PRT
<213> Unknown

<220>
<223> HuK2.4.L2

<400> 458

Leu Leu Leu Ser Ile Ala Leu Ser Val
1 5

<210> 459
<211> 11
<212> PRT
<213> Unknown

<220>
<223> HuK2.53.V11

<400> 459

Val Leu Val His Pro Gln Trp Val Leu Thr Val
1 5 10

<210> 460
<211> 10
<212> PRT

<213> Unknown

<220>
<223> HuK2.165

<400> 460

Phe Leu Arg Pro Arg Ser Leu Gln Cys Val
1 5 10

<210> 461
<211> 11
<212> PRT
<213> Unknown

<220>
<223> HuK2.216.V11

<400> 461

Pro Leu Val Cys Asn Gly Val Leu Gln Gly Val
1 5 10

<210> 462
<211> 219
<212> PRT
<213> Hepatitis B virus

<400> 462

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
20 25 30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
35 40 45

Pro Ser Asp Phe Phe Pro Ser Val Asn Phe Leu Leu Ser Leu Gly Ile
50 55 60

His Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr
65 70 75 80

Val Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu
85 90 95

Pro Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr
100 105 110

Tyr Lys Gly Ala Ala Ala Trp Leu Ser Leu Leu Val Pro Phe Val Asn
115 120 125

Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Thr Pro Ala Arg Val Thr
130 135 140

Gly Gly Val Phe Lys Val Gly Asn Phe Thr Gly Leu Tyr Asn Leu Pro
145 150 155 160

Ser Asp Phe Phe Pro Ser Val Lys Thr Leu Trp Lys Ala Gly Ile Leu
165 170 175

Tyr Lys Asn Val Ser Ile Pro Trp Thr His Lys Gly Ala Ala Leu Val
180 185 190

Val Asp Phe Ser Gln Phe Ser Arg Asn Ser Ala Ile Cys Ser Val Val
195 200 205

Arg Arg Ala Leu Met Pro Leu Tyr Ala Cys Ile
210 215

<210> 463
<211> 660
<212> DNA
<213> Hepatitis B virus

<400> 463
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc 60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg 120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgaa cttcctgctg 180

tccctgggaa tccacctgta tatggatgac gtggtgctgg gagtgggact gtccaggtac 240

gtggctaggc tgttcctgct gaccagaatc ctgaccatct ccaccctgcc agagaccacc 300

gtggtgagga ggcaggcctt cacctttagc cctacctata agggagccgc tgcctggctg 360

agcctgctgg tgccctttgt gaatatccct atccctagct cctgggcttt caagacccca 420

gccagggtga ccggaggagt gtttaaggtg ggaaacttca ccggcctgta taacctgccc 480

agcgatttct ttcctagcgt gaagaccctg tggaaggccg gaatcctgta caagaatgtg 540

tccatccctt ggacccacaa gggagccgct ctggtggtgg acttttccca gttcagcaga 600

aattccgcta tctgctccgt ggtgaggaga gctctgatgc cactgtatgc ctgtatctga 660

<210> 464
<211> 333
<212> PRT
<213> Hepatitis B virus

<400> 464

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp

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1               5                   10                  15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
            20                  25                  30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
        35                  40                  45

Pro Ser Asp Phe Phe Pro Ser Val Asn Phe Leu Leu Ser Leu Gly Ile
    50                  55                  60

His Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr
65                  70                  75                  80

Val Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu
                85                  90                  95

Pro Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr
            100                 105                 110

Tyr Lys Gly Ala Ala Ala Trp Leu Ser Leu Leu Val Pro Phe Val Asn
        115                 120                 125

Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Thr Pro Ala Arg Val Thr
    130                 135                 140

Gly Gly Val Phe Lys Val Gly Asn Phe Thr Gly Leu Tyr Asn Leu Pro
145                 150                 155                 160

Ser Asp Phe Phe Pro Ser Val Lys Thr Leu Trp Lys Ala Gly Ile Leu
                165                 170                 175

Tyr Lys Asn Val Ser Ile Pro Trp Thr His Lys Gly Ala Ala Leu Val
            180                 185                 190

Val Asp Phe Ser Gln Phe Ser Arg Asn Ser Ala Ile Cys Ser Val Val
        195                 200                 205

Arg Arg Lys Ala Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys
    210                 215                 220

Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala His Pro Ala Ala Met
225                 230                 235                 240

Pro His Leu Leu Lys Ala Ala Ala Asp Leu Leu Asp Thr Ala Ser Ala
                245                 250                 255
```

```
Leu Tyr Asn Ala Ala Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro
            260                 265                 270

Phe Asn Ala Ala Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Lys Leu
        275                 280                 285

Thr Phe Gly Arg Glu Thr Val Leu Glu Tyr Lys Ala Leu Ser Leu Asp
    290                 295                 300

Val Ser Ala Ala Phe Tyr Gly Ala Ala Glu Tyr Leu Val Ser Phe Gly
305                 310                 315                 320

Val Trp Gly Ala Ala Leu Met Pro Leu Tyr Ala Cys Ile
                325                 330
```

<210> 465
<211> 1002
<212> DNA
<213> Hepatitis B virus

<400> 465

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atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc     60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg    120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgaa cttcctgctg    180

tccctgggaa tccacctgta tatggatgac gtggtgctgg gagtgggact gtccaggtac    240

gtggctaggc tgttcctgct gaccagaatc ctgaccatct ccaccctgcc agagaccacc    300

gtggtgagga ggcaggcctt cacctttagc cctacctata agggagccgc tgcctggctg    360

agcctgctgg tgccctttgt gaatatccct atccctagct cctgggcttt caagacccca    420

gccagggtga ccggaggagt gtttaaggtg ggaaacttca ccggcctgta taacctgccc    480

agcgatttct ttcctagcgt gaagaccctg tggaaggccg gaatcctgta caagaatgtg    540

tccatccctt ggacccacaa gggagccgct ctggtggtgg acttttccca gttcagcaga    600

aatagcgcca tctgttcggt cgtgagaagg aaagcctgga tgatgtggta ctggggtcct    660

agtctgtata agaagtacac ctcattccca tggctcttga atgcccatcc cgctgcaatg    720

ccacacctgc ttaaagctgc ggcggatctg ctggacacag cctcagcttt atataatgct    780

gcagcaagat tctcctggtt gtctctctta gtgcccttca acgcagcttc ctggccaaaa    840

tttgccgttc cgaacctgaa gctcactttt ggaagagaga cagtacttga atacaaagca    900

ctaagccttg acgtgtcagc agccttctac ggagcagcag aatatctagt atcttttggg    960

gtctggggcg cagccctcat gcctctatac gcctgcattt ga                      1002
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<210> 466

<211> 333
<212> PRT
<213> Hepatitis B virus

<400> 466

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Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                  10                  15

Val Pro Gly Ser Arg Gly His Thr Leu Trp Lys Ala Gly Ile Leu Tyr
            20                  25                  30

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Phe Leu
        35                  40                  45

Pro Ser Asp Phe Phe Pro Ser Val Asn Phe Leu Leu Ser Leu Gly Ile
    50                  55                  60

His Leu Tyr Met Asp Asp Val Val Leu Gly Val Gly Leu Ser Arg Tyr
65                  70                  75                  80

Val Ala Arg Leu Phe Leu Leu Thr Arg Ile Leu Thr Ile Ser Thr Leu
                85                  90                  95

Pro Glu Thr Thr Val Val Arg Arg Gln Ala Phe Thr Phe Ser Pro Thr
            100                 105                 110

Tyr Lys Gly Ala Ala Ala Trp Leu Ser Leu Leu Val Pro Phe Val Asn
        115                 120                 125

Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Thr Pro Ala Arg Val Thr
    130                 135                 140

Gly Gly Val Phe Lys Val Gly Asn Phe Thr Gly Leu Tyr Asn Leu Pro
145                 150                 155                 160

Ser Asp Phe Phe Pro Ser Val Lys Thr Leu Trp Lys Ala Gly Ile Leu
                165                 170                 175

Tyr Lys Asn Val Ser Ile Pro Trp Thr His Lys Gly Ala Ala Leu Val
            180                 185                 190

Val Asp Phe Ser Gln Phe Ser Arg Asn Ser Ala Ile Cys Ser Val Val
        195                 200                 205

Arg Arg Lys Glu Tyr Leu Val Ser Phe Gly Val Trp Gly Leu Ser Leu
    210                 215                 220
```

```
Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala Ala Lys Tyr Thr Ser Phe
225                 230                 235                 240

Pro Trp Leu Leu Asn Ala His Pro Ala Ala Met Pro His Leu Leu Lys
                245                 250                 255

Ala Ala Ala Asp Leu Leu Asp Thr Ala Ser Ala Leu Tyr Asn Ser Trp
            260                 265                 270

Pro Lys Phe Ala Val Pro Asn Leu Lys Leu Thr Phe Gly Arg Glu Thr
        275                 280                 285

Val Leu Glu Tyr Lys Ala Ala Trp Met Met Trp Tyr Trp Gly Pro Ser
    290                 295                 300

Leu Tyr Lys Ala Ala Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro
305                 310                 315                 320

Phe Gly Ala Ala Ala Leu Met Pro Leu Tyr Ala Cys Ile
                325                 330
```

<210> 467
<211> 1002
<212> DNA
<213> Hepatitis B virus

<400> 467

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atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc     60

agaggacaca ccctgtggaa ggccggaatc ctgtataagg ccaagttcgt ggctgcctgg    120

accctgaagg ctgccgcttt cctgcctagc gatttctttc ctagcgtgaa cttcctgctg    180

tccctgggaa tccacctgta tatggatgac gtggtgctgg gagtgggact gtccaggtac    240

gtggctaggc tgttcctgct gaccagaatc ctgaccatct ccaccctgcc agagaccacc    300

gtggtgagga ggcaggcctt cacctttagc cctacctata agggagccgc tgcctggctg    360

agcctgctgg tgccctttgt gaatatccct atccctagct cctgggcttt caagacccca    420

gccagggtga ccggaggagt gtttaaggtg ggaaacttca ccggcctgta taacctgccc    480

agcgatttct ttcctagcgt gaagaccctg tggaaggccg gaatcctgta caagaatgtg    540

tccatccctt ggacccacaa gggagccgct ctggtggtgg acttttccca gttcagcaga    600

aattcagcaa tttgttcggt ggtgagaaga aaggaatatc ttgtttcatt tggcgtctgg    660

gggctgtcac tggatgtaag tgcggcattt tacaatgccg ccgcaaaata tacaagcttc    720

ccatggctcc taaacgcaca cccagctgca atgccgcatc tactgaaagc agccgctgac    780

ctcttagaca ctgcctccgc tctgtacaac tcttggccca agtttgccgt gcctaatctc    840
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aagttgacct tcggtagaga gacagtctta gaatacaaag cggcctggat gatgtggtac 900

tggggaccct ctctgtataa agccgctgca aggttctcct ggcttagcct tctcgtacca 960

ttcggagcag ctgccctaat gcctttgtac gcatgcatct ga 1002

<210> 468
<211> 295
<212> PRT
<213> Hepatitis B virus

<400> 468

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Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                  10                  15

Val Pro Gly Ser Arg Gly Ser Trp Pro Lys Phe Ala Val Pro Asn Leu
            20                  25                  30

Lys Ala Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala
        35                  40                  45

Ala Lys Ser Thr Leu Pro Glu Thr Thr Val Val Arg Arg Lys His Pro
    50                  55                  60

Ala Ala Met Pro His Leu Leu Lys Ala Ala Ala His Thr Leu Trp Lys
65                  70                  75                  80

Ala Gly Ile Leu Tyr Lys Lys Ala Phe Leu Leu Thr Arg Ile Leu Thr
                85                  90                  95

Ile Gly Ala Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala
            100                 105                 110

Ala Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala Ala Ala Arg Phe
        115                 120                 125

Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Thr Pro Ala Arg
    130                 135                 140

Val Thr Gly Gly Val Phe Lys Ala Ala Glu Tyr Leu Val Ser Phe Gly
145                 150                 155                 160

Val Trp Gly Ala Ala Ala Tyr Met Asp Asp Val Val Leu Gly Val Asn
                165                 170                 175

Asp Leu Leu Asp Thr Ala Ser Ala Leu Tyr Asn Ala Ala Ala Phe Pro
            180                 185                 190
```

```
His Cys Leu Ala Phe Ser Tyr Met Lys Ala Ala Ala Trp Met Met Trp
        195                 200                 205

Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Ala Ser Ala Ile Cys Ser Val
    210                 215                 220

Val Arg Arg Lys Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Ile
225                 230                 235                 240

Pro Ile Pro Ser Ser Trp Ala Phe Lys Ala Ala Trp Leu Ser Leu Leu
                245                 250                 255

Val Pro Phe Val Asn Ala Phe Leu Pro Ser Asp Phe Phe Pro Ser Val
            260                 265                 270

Lys Leu Thr Phe Gly Arg Glu Thr Val Leu Glu Tyr Lys Gln Ala Phe
        275                 280                 285

Thr Phe Ser Pro Thr Tyr Lys
    290                 295
```

<210> 469
<211> 888
<212> DNA
<213> Hepatitis B virus

<400> 469

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atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc     60

agaggatctt ggcctaaatt cgcagtgcca aaccttaaag ccgcggctgc taagttcgta    120

gctgcctgga cactaaaggc cgccgctaag agcacactgc cagagaccac cgtggtccgg    180

cgaaagcatc cagccgcaat gccccacttg ctcaaagcag ccgcccacac tctttggaag    240

gctgggatat tgtacaagaa agccttcctt ctgaccagga tattaactat cggagctctg    300

tcactcgacg tttctgctgc cttctacaac gcggcggcaa aatacactag ctttccatgg    360

ctactcaacg cagccgccag attttcttgg ctatcactac tggtgccatt taatgcagca    420

acacctgcta gagtgactgg cggcgtcttt aaagcagccg agtacttggt gagctttggc    480

gtctggggtg cagcggcata tatggatgat gtagtgttag gggtgaacga cctcctggac    540

acagccagtg cgctgtacaa tgcagctgca ttcccgcatt gcctagcctt cagttatatg    600

aaagcagcag cctggatgat gtggtactgg ggaccgtccc tttataaagc agcttcagca    660

atctgttccg ttgtgaggag aaaaaacttt ttactctccc tcggtattca cctgaacatt    720

cccatccctt cctcatgggc attcaaagcc gcttggctga gtctactcgt acctttcgtt    780

aatgcatttc tgcccagcga ctttttcccc tcggtaaaac tgacattcgg acgcgaaaca    840
```

gtccttgaat ataagcaggc cttcacgttc tcaccaacct ataaatga 888

<210> 470
<211> 296
<212> PRT
<213> Hepatitis B virus

<400> 470

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Tyr Met Asp Asp Val Val Leu Gly Val Asn
20 25 30

Ala Ala Ala Glu Tyr Leu Val Ser Phe Gly Val Trp Asn Asp Leu Leu
35 40 45

Asp Thr Ala Ser Ala Leu Tyr Gly Ala Ala His Thr Leu Trp Lys Ala
50 55 60

Gly Ile Leu Tyr Lys Lys Ala Phe Leu Pro Ser Asp Phe Phe Pro Ser
65 70 75 80

Val Lys Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Lys Ala Ala
85 90 95

Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Ser Trp
100 105 110

Pro Lys Phe Ala Val Pro Asn Leu Lys Ala Ala Ala Gln Ala Phe Thr
115 120 125

Phe Ser Pro Thr Tyr Lys Asn Ala Ala Ala Ser Ala Ile Cys Ser Val
130 135 140

Val Arg Arg Lys Ala Phe Leu Leu Thr Arg Ile Leu Thr Ile Asn Ile
145 150 155 160

Pro Ile Pro Ser Ser Trp Ala Phe Lys Ala Ala Trp Met Met Trp Tyr
165 170 175

Trp Gly Pro Ser Leu Tyr Lys Ala Ala Ala Thr Pro Ala Arg Val Thr
180 185 190

Gly Gly Val Phe Lys Ala Ala Asn Phe Leu Leu Ser Leu Gly Ile His
195 200 205

```
Leu Asn Leu Thr Phe Gly Arg Glu Thr Val Leu Glu Tyr Lys His Pro
    210                 215                 220

Ala Ala Met Pro His Leu Leu Lys Ala Ala Ser Thr Leu Pro Glu Thr
225                 230                 235                 240

Thr Val Val Arg Arg Lys Trp Leu Ser Leu Leu Val Pro Phe Val Asn
                245                 250                 255

Ala Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala
            260                 265                 270

Lys Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala Ala Lys
        275                 280                 285

Tyr Thr Ser Phe Pro Trp Leu Leu
    290                 295
```

<210> 471
<211> 891
<212> DNA
<213> Hepatitis B virus

<400> 471

```
atgggaatgc aggtgcagat ccagagcctg tttctgctcc tcctgtgggt gcccgggtcc     60

agaggataca tggatgacgt tgtgttaggc gttaatgcag ccgcagaata tctcgtgtca    120

ttcggcgtct ggaacgacct gttggacact gcatctgctc tgtacggtgc agcccatacc    180

ctgtggaagg ccggaatcct ctacaaaaag gcattcctac ctagcgactt ttttccttca    240

gtgaaagcct tcccacattg cctagcattc tcgtatatga aagcggctag gttctcatgg    300

cttagtcttc tagtaccttt caatgccgcc tcctggccca aattcgccgt accaaatcta    360

aaagcggccg cgcaggcctt tacattctct ccgacttata aaaatgcagc agcctccgct    420

atttgtagcg tcgtgcgccg aaaggccttc ctgctaaccc ggattttgac gataaacatc    480

cccatccctt ctagctgggc tttcaaagca gcatggatga tgtggtactg gggtcccagc    540

ttatacaaag ctgcggcaac cccagcaaga gtgacagggg gcgtgtttaa ggccgccaac    600

ttcctcctga gtctcggaat acacctgaac ttaacctttg ggagagagac agtactggag    660

tataaacacc cagcagctat gccgcaccta ctcaaagccg cttcaacact cccagaaaca    720

actgtagtga ggagaaaatg gctctccctg cttgtcccat ttgtcaacgc cgccgccgct    780

aagtttgtgg ccgcttggac acttaaggct gcagcaaagt tgtcacttga tgttagtgca    840

gcgttctata acgcagctgc aaaatacact tcctttccct ggctgctgtg a              891
```

<210> 472

<211> 403
<212> PRT
<213> Hepatitis B virus

<400> 472

```
Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1               5                  10                  15

Val Pro Gly Ser Arg Gly Phe Leu Leu Thr Arg Ile Leu Thr Ile Asn
            20                  25                  30

Ala Ala Ala Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Lys Ala Ala
        35                  40                  45

Ala His Thr Leu Trp Lys Ala Gly Ile Leu Tyr Lys Lys Ala Asp Leu
    50                  55                  60

Leu Asp Thr Ala Ser Ala Leu Tyr Asn Gln Ala Phe Thr Phe Ser Pro
65                  70                  75                  80

Thr Tyr Lys Gly Ala Ala Ala Asn Val Ser Ile Pro Trp Thr His Lys
                85                  90                  95

Gly Ala Ala Ala Phe Leu Leu Ser Leu Gly Ile His Leu Asn Ile Pro
            100                 105                 110

Ile Pro Ser Ser Trp Ala Phe Lys Ala Ala Ala Leu Trp Phe His Ile
        115                 120                 125

Ser Cys Leu Thr Phe Lys Ala Ala Ala Ile Leu Leu Leu Cys Leu Ile
    130                 135                 140

Phe Leu Leu Asn Ala Ala Ala Tyr Pro Ala Leu Met Pro Leu Tyr Ala
145                 150                 155                 160

Cys Ile Asn Ala His Pro Ala Ala Met Pro His Leu Leu Lys Ala Ala
                165                 170                 175

Ala Ser Phe Cys Gly Ser Pro Tyr Lys Ala Ala Gly Leu Ser Arg Tyr
            180                 185                 190

Val Ala Arg Leu Asn Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Phe
        195                 200                 205

Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Ala Phe Pro His Cys Leu
    210                 215                 220
```

```
Ala Phe Ser Tyr Met Lys Ala Glu Tyr Leu Val Ser Phe Gly Val Trp
225                 230                 235                 240

Asn Ala Ala Leu Thr Phe Gly Arg Glu Thr Val Leu Glu Tyr Lys Ala
                245                 250                 255

Ala Ala Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Ala Tyr Met Asp
            260                 265                 270

Asp Val Val Leu Gly Val Asn Leu Val Val Asp Phe Ser Gln Phe Ser
        275                 280                 285

Arg Asn Ala Ala Ala Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Asn
    290                 295                 300

Ala Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala
305                 310                 315                 320

Thr Pro Ala Arg Val Thr Gly Gly Val Phe Lys Ala Ala Trp Leu Ser
                325                 330                 335

Leu Leu Val Pro Phe Val Asn Ser Ala Ile Cys Ser Val Val Arg Arg
            340                 345                 350

Lys Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys Trp
        355                 360                 365

Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Ala Ser Thr Leu
    370                 375                 380

Pro Glu Thr Thr Val Val Arg Arg Lys Leu Ser Leu Asp Val Ser Ala
385                 390                 395                 400

Ala Phe Tyr
```

<210> 473
<211> 1215
<212> DNA
<213> Hepatitis B virus

<400> 473
atgggaatgc aggtccagat acagagcttg ttcctcctcc tgctttgggt ccccggatca 60

aggggtttcc tcctaacccg catcctgaca attaacgccg cagcctcctg gccaaaattt 120

gccgtgccaa atctcaaggc agctgcacac acactatgga aagcagggat actgtacaag 180

aaagccgatc tgctagacac agcgtctgcg ttgtacaacc aggcttttac tttctctcct 240

acatataaag gcgcagctgc aaacgtgagt atcccttgga cgcacaaagg agccgctgcc 300

aacttcttac tgtccctggg catccatcta aatatcccta ttccttcatc ctgggcattt 360

aaagcagccg ccttatggtt ccacataagt tgtctgacct tcaaagccgc agcaatcctg 420

ctcctttgcc tcattttctt actaaacgcc gctgcctatc cagctcttat gccattgtac 480

gcatgtatca acgcccaccc cgcagcaatg ccccacctcc ttaaagctgc cgccagtttc 540

tgcggttctc cttataaagc agcagggctg tccagatacg tagctaggct aaacaagtat 600

accagcttcc cctggttact taatttcctg ccgtcagatt tctttccatc agttaaggcc 660

ttccctcatt gtctggcctt tagctacatg aaggctgaat atttggtatc cttcggcgtg 720

tggaatgcgg cactgacatt tggaagggag acagtgctcg agtacaaagc cgccgcacta 780

ccctcggact tcttcccatc ggtcaaagct tacatggacg atgtagtcct cggcgttaac 840

ttagtagtgg acttttctca attttccaga aacgcagcgg ccagatggat gtgccttcgg 900

cgttttataa taaacgccgc tcgattcagc tggctatcac tcctagttcc atttaatgca 960

gctacacccg cacgggtgac aggtggagtt ttcaaggcag cgtggctttc actgcttgtg 1020

ccatttgtga actcagctat ttgctcagta gtgagaagga aggcaaaatt cgtcgctgcc 1080

tggactctca aagctgccgc aaagtggatg atgtggtatt ggggaccgag cttgtacaaa 1140

gcggcctcta ctctgccaga aactaccgta gtgagaagaa aactgagcct ggacgtcagc 1200

gcggcattct actga 1215

<210> 474
<211> 403
<212> PRT
<213> Hepatitis B virus

<400> 474

Met Gly Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Leu Trp
1 5 10 15

Val Pro Gly Ser Arg Gly Phe Leu Leu Ser Leu Gly Ile His Leu Asn
20 25 30

Ala Ala Ala Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala Ala Ala
35 40 45

Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Phe Pro
50 55 60

His Cys Leu Ala Phe Ser Tyr Met Lys Ala Ala Leu Val Val Asp Phe
65 70 75 80

```
Ser Gln Phe Ser Arg Gly Ala Ile Leu Leu Leu Cys Leu Ile Phe Leu
                85                  90                  95

Leu Asn Ala Ala Ala His Thr Leu Trp Lys Ala Gly Ile Leu Tyr Lys
            100                 105                 110

Lys Ala Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Tyr
        115                 120                 125

Pro Ala Leu Met Pro Leu Tyr Ala Cys Ile Gly Ala Ala Ala Trp Leu
    130                 135                 140

Ser Leu Leu Val Pro Phe Val Asn Phe Leu Leu Thr Arg Ile Leu Thr
145                 150                 155                 160

Ile Asn Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Ala Ala Ala Glu
                165                 170                 175

Tyr Leu Val Ser Phe Gly Val Trp Asn Leu Pro Ser Asp Phe Phe Pro
            180                 185                 190

Ser Val Lys Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Asp Leu
        195                 200                 205

Leu Asp Thr Ala Ser Ala Leu Tyr Asn Ser Trp Pro Lys Phe Ala Val
    210                 215                 220

Pro Asn Leu Lys Ala Ala Ala Ser Ala Ile Cys Ser Val Val Arg Arg
225                 230                 235                 240

Lys Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr Asn Ala Ala Ala Lys
                245                 250                 255

Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Lys Ala Ala Asn Val
            260                 265                 270

Ser Ile Pro Trp Thr His Lys Gly Ala Ala Gly Leu Ser Arg Tyr Val
        275                 280                 285

Ala Arg Leu Asn Ala Ala Ala Ser Thr Leu Pro Glu Thr Thr Val Val
    290                 295                 300

Arg Arg Lys His Pro Ala Ala Met Pro His Leu Leu Lys Ala Ala Ala
305                 310                 315                 320

Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Asn Ala Ser Phe Cys Gly
                325                 330                 335
```

Ser Pro Tyr Lys Ala Ala Tyr Met Asp Asp Val Val Leu Gly Val Asn
340 345 350

Ala Leu Trp Phe His Ile Ser Cys Leu Thr Phe Lys Ala Ala Ala Thr
355 360 365

Pro Ala Arg Val Thr Gly Gly Val Phe Lys Ala Ala Ala Leu Thr Phe
370 375 380

Gly Arg Glu Thr Val Leu Glu Tyr Lys Gln Ala Phe Thr Phe Ser Pro
385 390 395 400

Thr Tyr Lys

<210> 475
<211> 1212
<212> DNA
<213> Hepatitis B virus

<400> 475
atgggaatgc aggtgcaaat acagtctctc ttccttttgc ttctctgggt tccaggatca 60

cggggcttct tgcttagctt gggcatccac ctaaatgctg ctgcaaaata cacatctttt 120

ccttggctcc ttaatgccgc cgctaggttt tcatggctga gtctgctagt acctttcaat 180

gcggctttcc cacattgcct agcttttagc tatatgaaag ctgctttagt cgtggacttt 240

tcacagttta gcagaggagc aatcctgctg ctatgtctga tattccttct aaacgcagca 300

gcccacacac tctggaaagc tggtatcctt tacaagaaag cctggatgat gtggtattgg 360

ggacccagcc tctacaaagc ataccctgcc ctgatgccac tatacgcatg cattggcgcg 420

gcagcctggt tatccctttt agtaccgttt gtcaactttc tattaaccag aatcctgacg 480

attaatattc cgatcccaag ttcctgggca ttcaaagcag ccgcggagta tctggtttca 540

tttggcgtat ggaacctgcc aagcgacttc tttccttctg ttaagttcct cccctccgat 600

ttctttccat cggtgaaaga cctccttgat accgcgagcg ctctgtacaa ctcgtggcca 660

aaattcgcag ttccaaacct aaaagccgcc gccagtgcca tttgttccgt ggtaaggaga 720

aaattatcac tcgacgtgtc cgcagcattt tataacgctg ctgcaaagtt tgtcgcagca 780

tggacattga aggctgcagc gaaagcagca aatgtatcaa taccctggac ccacaagggt 840

gcagccgggc tgtctaggta tgtggcgagg ctaaacgccg ccgcctcaac actgcctgag 900

actactgtcg tgagacgcaa acaccctgcc gcaatgcccc acctgctgaa agcagccgca 960

cgatggatgt gcctcagaag attcataata aacgcttctt tctgtgggtc accctacaaa 1020

gccgcttaca tggacgatgt ggtcctcgga gtgaatgccc tctggttcca tatcagctgc 1080

ctgacattca aggcagccgc cacccccgct cgtgtgacag gaggtgtctt caaagccgcg 1140

gcactgactt tcggtcggga aactgtattg gaatataagc aggccttcac attctcccca 1200

acatacaagt ga 1212

<210> 476
<211> 410
<212> PRT
<213> Hepatitis B virus

<400> 476

Met Gln Val Gln Ile Gln Ser Leu Phe Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Arg Gly Phe Leu Leu Ser Leu Gly Ile His Leu Asn Ala Ala
20 25 30

Ala Lys Tyr Thr Ser Phe Pro Trp Leu Leu Asn Ala Ala Ala Arg Phe
35 40 45

Ser Trp Leu Ser Leu Leu Val Pro Phe Asn Ala Ala Phe Pro His Cys
50 55 60

Leu Ala Phe Ser Tyr Met Lys Ala Ala Leu Val Val Asp Phe Ser Gln
65 70 75 80

Phe Ser Arg Gly Ala Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Asn
85 90 95

Ala Ala Ala His Thr Leu Trp Lys Ala Gly Ile Leu Tyr Lys Lys Ala
100 105 110

Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Lys Ala Tyr Pro Ala
115 120 125

Leu Met Pro Leu Tyr Ala Cys Ile Gly Ala Ala Ala Trp Leu Ser Leu
130 135 140

Leu Val Pro Phe Val Asn Phe Leu Leu Thr Arg Ile Leu Thr Ile Asn
145 150 155 160

Ala Ala Ala Ile Pro Ile Pro Ser Ser Trp Ala Phe Lys Ala Ala Ala
165 170 175

Glu Tyr Leu Val Ser Phe Gly Val Trp Asn Leu Pro Ser Asp Phe Phe
180 185 190

```
Pro Ser Val Lys Ala Ala Ala Phe Leu Pro Ser Asp Phe Phe Pro Ser
        195                 200                 205

Val Lys Ala Ala Ala Asp Leu Leu Asp Thr Ala Ser Ala Leu Tyr Asn
    210                 215                 220

Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Lys Ala Ala Ala Ser Ala
225                 230                 235                 240

Ile Cys Ser Val Val Arg Arg Lys Leu Ser Leu Asp Val Ser Ala Ala
                245                 250                 255

Phe Tyr Asn Ala Ala Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala
            260                 265                 270

Ala Ala Lys Ala Ala Asn Val Ser Ile Pro Trp Thr His Lys Gly Ala
        275                 280                 285

Ala Gly Leu Ser Arg Tyr Val Ala Arg Leu Asn Ala Ala Ala Ser Thr
    290                 295                 300

Leu Pro Glu Thr Thr Val Val Arg Arg Lys His Pro Ala Ala Met Pro
305                 310                 315                 320

His Leu Leu Lys Ala Ala Ala Arg Trp Met Cys Leu Arg Arg Phe Ile
                325                 330                 335

Ile Asn Ala Ser Phe Cys Gly Ser Pro Tyr Lys Ala Ala Tyr Met Asp
            340                 345                 350

Asp Val Val Leu Gly Val Asn Ala Leu Trp Phe His Ile Ser Cys Leu
        355                 360                 365

Thr Phe Lys Ala Ala Ala Thr Pro Ala Arg Val Thr Gly Gly Val Phe
    370                 375                 380

Lys Ala Ala Ala Leu Thr Phe Gly Arg Glu Thr Val Leu Glu Tyr Lys
385                 390                 395                 400

Gln Ala Phe Thr Phe Ser Pro Thr Tyr Lys
                405                 410
```

<210> 477
<211> 1239
<212> DNA
<213> Hepatitis B virus

<400> 477

atgggaatgc aggtgcaaat acagtctctc ttccttttgc ttctctgggt tccaggatca 60

cggggcttct tgcttagctt gggcatccac ctaaatgctg ctgcaaaata cacatctttt 120

ccttggctcc ttaatgccgc cgctaggttt tcatggctga gtctgctagt acctttcaat 180

gcggctttcc cacattgcct agcttttagc tatatgaaag ctgctttagt cgtggacttt 240

tcacagttta gcagaggagc aatcctgctg ctatgtctga tattccttct aaacgcagca 300

gcccacacac tctggaaagc tggtatcctt tacaagaaag cctggatgat gtggtattgg 360

ggacccagcc tctacaaagc ataccctgcc ctgatgccac tatacgcatg cattggcgcg 420

gcagcctggt tatccctttt agtaccgttt gtcaactttc tattaaccag aatcctgacg 480

attaatgctg ccgccattcc gatcccaagt tcctgggcat tcaaagcagc cgcggagtat 540

ctggtttcat ttggcgtatg gaacctgcca agcgacttct ttccttctgt taaggccgct 600

gctttcctcc cctccgattt ctttccatcg gtgaaagccg ctgccgacct ccttgatacc 660

gcgagcgctc tgtacaactc gtggccaaaa ttcgcagttc caaacctaaa agccgccgcc 720

agtgccattt gttccgtggt aaggagaaaa ttatcactcg acgtgtccgc agcattttat 780

aacgctgctg caaagtttgt cgcagcatgg acattgaagg ctgcagcgaa agcagcaaat 840

gtatcaatac cctggaccca caagggtgca gccgggctgt ctaggtatgt ggcgaggcta 900

aacgccgccg cctcaacact gcctgagact actgtcgtga gacgcaaaca ccctgccgca 960

atgccccacc tgctgaaagc agccgcacga tggatgtgcc tcagaagatt cataataaac 1020

gcttctttct gtgggtcacc ctacaaagcc gcttacatgg acgatgtggt cctcggagtg 1080

aatgccctct ggttccatat cagctgcctg acattcaagg cagccgccac ccccgctcgt 1140

gtgacaggag gtgtcttcaa agccgcggca ctgactttcg gtcgggaaac tgtattggaa 1200

tataagcagg ccttcacatt ctccccaaca tacaagtga 1239

<210> 478
<211> 344
<212> PRT
<213> Hepatitis B virus

<400> 478

Met Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala Asp
1 5 10 15

Gly Pro Gly Pro Gly Leu Cys Gln Val Phe Ala Asp Ala Thr Pro Thr
20 25 30

Gly Trp Gly Leu Gly Pro Gly Pro Gly Arg His Tyr Leu His Thr Leu
35 40 45

```
Trp Lys Ala Gly Ile Leu Tyr Lys Gly Pro Gly Pro Gly Pro His His
    50                  55                  60

Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu Met Thr Leu
65                  70                  75                  80

Ala Gly Pro Gly Pro Gly Glu Ser Arg Leu Val Val Asp Phe Ser Gln
                85                  90                  95

Phe Ser Arg Gly Asn Gly Pro Gly Pro Gly Pro Phe Leu Leu Ala Gln
            100                 105                 110

Phe Thr Ser Ala Ile Cys Ser Val Val Gly Pro Gly Pro Gly Leu Val
        115                 120                 125

Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Gly Pro Gly
    130                 135                 140

Pro Gly Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys
145                 150                 155                 160

Ile Gly Pro Gly Pro Gly Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp
                165                 170                 175

Val Ser Ala Ala Phe Gly Pro Gly Pro Gly Leu Gln Ser Leu Thr Asn
            180                 185                 190

Leu Leu Ser Ser Asn Leu Ser Trp Leu Gly Pro Gly Pro Gly Ala Gly
        195                 200                 205

Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Gly Pro Gly
    210                 215                 220

Pro Gly Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala Tyr Arg
225                 230                 235                 240

Pro Pro Asn Ala Pro Ile Gly Pro Gly Pro Gly Val Gly Pro Leu Thr
                245                 250                 255

Val Asn Glu Lys Arg Arg Leu Lys Leu Ile Gly Pro Gly Pro Gly Lys
            260                 265                 270

Gln Cys Phe Arg Lys Leu Pro Val Asn Arg Pro Ile Asp Trp Gly Pro
        275                 280                 285

Gly Pro Gly Ala Ala Asn Trp Ile Leu Arg Gly Thr Ser Phe Val Tyr
    290                 295                 300
```

Val Pro Gly Pro Gly Pro Gly Lys Gln Ala Phe Thr Phe Ser Pro Thr
305 310 315 320

Tyr Lys Ala Phe Leu Cys Gly Pro Gly Pro Gly Ala Lys Phe Val Ala
325 330 335

Ala Trp Thr Leu Lys Ala Ala Ala
340

<210> 479
<211> 1035
<212> DNA
<213> Hepatitis B virus

<400> 479
atgggaactt cttttgtgta tgtcccttcc gctctgaacc cagcagacgg acccgggcct 60

ggcctgtgcc aggtcttcgc cgacgcaact cccacagggt gggggctggg gccaggacca 120

ggcaggcact acctgcatac tctgtggaag gcaggaatcc tctataaagg gcccggccca 180

ggccctcacc acaccgccct gaggcaggcc atcctgtgct gggggggagct catgaccctg 240

gccggacctg gacccgggga gagcagactg gtggtggatt tcagccaatt cagcagagga 300

aacggacccg gccctgggcc ttttctgctg gctcagttta catctgctat ttgttctgtg 360

gtcggccccg ggcccggact cgtgcctttc gtgcagtggt tcgtgggact gtcccctaca 420

gtcgggcccg gcccagggct gcatctgtac tcccacccaa tcatcctcgg cttccgcaag 480

attggacccg gcccaggctc cagcaatctc tcctggctct ctctggacgt gtctgccgcc 540

tttggccctg gaccaggcct gcaaagcctg actaatctgc tcagcagcaa cctgtcctgg 600

ctgggacctg gcccaggggc tggcttcttt ctgctcaccc ggattctcac aattccccag 660

tccggaccag gaccaggagt cagtttcggg gtgtggatca ggacccctcc tgcttataga 720

ccacccaatg ctccaatcgg ccccggccct ggcgtcgggc cactgaccgt gaatgagaag 780

cgccggctga agctgatcgg ccctggccct ggcaagcagt gctttcgcaa actgcccgtg 840

aacagaccta ttgattgggg ccccggccct ggagcagcca actggattct caggggaaca 900

agcttcgtct acgtgcccgg gcccggacca gggaagcagg cttttacctt ctctcccact 960

tacaaggcct tcctctgtgg gccaggcccc ggcgccaagt ttgtggcagc atggaccctc 1020

aaagccgctg cctga 1035